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Generic State Pesticide Management Plan

June, 2003

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Gary Bahr
Idaho State Department of Agriculture

Jim Ebbert
US Geological Survey

Laurie Morgan
Washington State Department of Ecology

Frank Voss
US Geological Survey

Cindy Moore
US Environmental Protection Agency

Lee Faulconer, Original Author of Generic Plan
Washington State Department of Agriculture

Donna Rise
Montana Department of Agriculture

STATE LIAISON

The State Liaison for the *Washington State Generic Pesticide Management Plan: Ground Water Strategy* will be the WSDA Water Quality Protection Manager. The purpose of the state liaison is to have a single contact point responsible for the transmittal and receipt of official correspondence and information between the U.S. Environmental Protection Agency and the Washington State Department of Agriculture.

Contact:
Kirk V. Cook, PG, PH
Ground Water Quality Protection Manager
Water Quality Protection Program
Washington State Department of Agriculture
Phone: (360) 902-2047
Fax: (360) 902-2093
Email: kcook@agr.wa.gov

Mailing Address:
Washington State Dept of Agriculture
Water Quality Protection Program
Pesticide Management Division
P.O. Box 42589
Olympia, WA 98504-2589

WSDA Website:
http://www.wa.gov/agr/

CONCURRENCE SIGNATURES

The following agency representatives have read the *Washington State Generic Pesticide Management Plan: Ground Water Strategy* and concur with their agency's responsibilities as stated in the plan.

Valoria H. Loveland, Director
Washington State Department of Agriculture

Tom Fitzsimmons, Director
Washington State Department of Ecology

Mary Selecky, Secretary
Washington State Department of Health

Doug Sutherland, Commissioner of Public Lands
Washington State Department of Natural Resources

James Zuiches, Dean
College of Agriculture and Home Economics
Washington State University,
Cooperative Extension

Mark Clark, Executive Director
Washington State Conservation Commission

Cynthia Barton, District Chief
United States Geological Survey

Leonard Jordan, State Conservationist
USDA, Natural Resources Conservation Service

EXECUTIVE SUMMARY

This draft state generic pesticide management plan was written in response to the Environmental Protection Agency's (EPA's) *Pesticides and Ground-Water Strategy (1991)*. The strategy requires states to write management plans for pesticides identified by EPA as posing a threat to ground water from normal use. The purpose of these plans is to provide for the continued use of specific pesticides important to a state's agriculture while ensuring that the ground water resources are protected from contamination. While not required by EPA, this state generic management plan provides Washington State and EPA an opportunity to discuss issues prior to writing pesticide-specific management plans. If Washington State chooses not to write a pesticide-specific plan for a pesticide targeted by EPA, or the state plan is not approved, the pesticide cannot be sold or used in the state.

Washington's generic plan stresses prevention of contamination and voluntary measures over regulatory approaches. However, the plan does include a framework for regulatory action(s) if deemed necessary to protect ground water quality. The plan outlines a cooperative approach with other local, state and federal agencies as well as the agricultural community in an effort to emphasize and maximize existing resources, programs and funding.

This generic pesticide management plan (PMP) also is an implementing agreement under the Memorandum of Understanding between the Washington State Department of Agriculture (WSDA), the Department of Ecology, and Department of Health regarding how the State Ground Water Quality Standards will be implemented and enforced for pesticides. A significant aspect of this PMP is that it allows WSDA to establish enforcement limits and early warning values for specific pesticides, to define the point of compliance in ground water, and to approve Best Management Practices under the "AKART" criteria for pesticides of ground water concern. As described in the guidance for implementing the Standards (Ecology publication #96-02), the PMP has been developed consistent with the strategy "Protecting Ground Water: A Strategy for Managing Agricultural Pesticides and Nutrients."

As the FIFRA (Federal Insecticide, Fungicide And Rodenticide Act) lead agency and the lead for implementing the PMP program, WSDA will be responsible for monitoring or coordinating monitoring of pesticides in ground water, determining impacts, conducting prevention and response actions, and taking regulatory actions under FIFRA and the Washington State pesticide laws and rules. WSDA will continue to participate on the Washington State Interagency Ground Water Committee and will use this group to coordinate PMP activities including prevention and response actions.

The *Washington State Generic Pesticide Management Plan: Ground Water Protection Strategy* outlines the government agencies involved in protecting ground water from pesticides. The document describes the roles of each agency, and how these authorities and programs will be coordinated. The involvement of pesticide applicators, dealers, and registrants is described as well. This document is a generic pesticide management plan and will be used to prevent and respond to any potential or actual pesticide threats to

ground water, and to develop pesticide-specific management plans for the four targeted pesticides and other pesticides important to Washington State's agricultural industry, if deemed necessary. Ground water and human health protection are the primary goals of this document and the PMP program.

The core aspects of the Washington State Pesticide Management Plan are:

- Ground water assessment and planning;
- Ground water monitoring and prevention actions; and
- Response to ground water contamination.

Other important components include enforcement mechanisms, public awareness and participation, information dissemination, and records and reporting progress. An emphasis will be placed on information and education, best management practices (BMPs), monitoring, and prevention. If the concentration of a pesticide in ground water, resulting from current legal use, is equal to or greater than an established reference point as outlined in Chapter 7, *Response and Enforcement Mechanisms*, then prohibition or use restriction(s) will be imposed to protect the resource. The response and regulatory framework outlines the processes WSDA will use to define and respond to contamination situations.

Working groups composed of representatives from state agencies, farmers, industry, environmental groups and others will assist in the development of pesticide-specific state management plans. This generic pesticide management plan will provide general guidance, and allow the flexibility needed to develop pesticide-specific management plans that are both environmentally responsible and economically and socially realistic. The challenge will be to write pesticide-specific plans that protect ground water, meet EPA criteria, and can be implemented with available state resources.

Various agency roles are outlined in this state generic pesticide management plan. Additional funds and commitments will be needed to implement additional requirements and pesticide-specific management plans.

CHAPTER 1
INTRODUCTION TO THE WASHINGTON STATE GENERIC PESTICIDE MANAGEMENT PLAN

The central goal of the EPA's *Pesticides and Ground Water Strategy*, published in October 1991, is to provide states with flexibility in the protection of ground water resources and management of agricultural chemicals. Part of this strategy is the development of pesticide-specific management plans for those agricultural chemicals that have the potential to impair ground water resources by states that wish to continue their use.

Prior to the development of pesticide-specific management plans, EPA has encouraged states to develop a generic pesticide management plan. The generic management plan will serve as the basis from which pesticide-specific management plans are developed. When EPA designates, by rule, specific pesticides requiring a management plan for continued use, the state will develop a pesticide-specific management plan based on EPA's twelve key elements of concern. In this way, the generic pesticide management plan becomes a template for all pesticide-specific management plans.

Since 1987, EPA has been working to develop a pesticides and ground water rule requiring pesticide management plans (PMPs) to be written for specific pesticides. On June 26, 1996, the EPA Office of Pesticide Programs (OPP) published their *Pesticides and Ground Water State Management Plan Regulation; Proposed Rule*. The draft rule would require pesticide-specific management plans to be written for atrazine, simazine, alachlor, and metolachlor. As this national process progressed, WSDA, the state lead agency for the PMP process, began writing the generic PMP draft and planning for pesticide- specific plans.

In 1996, the first official draft of the plan was circulated to Washington State agencies and submitted to EPA Region10. In 1997 the WSDA Water Quality Protection Program was formed and in 1998 EPA began a regional review of the agency's draft generic plan. In 1999, Water Quality Protection Program staff received EPA comments from the regional review and committed to updating the generic plan and resubmitting the revised version in December 2000. Revisions to the December 2000 version were completed in the spring of 2002. As of April 2003, the proposed federal rule is not final.

The information contained in this document conforms to the following twelve component requirements specified by EPA in the *Pesticides and Ground Water Strategy*:

1. State's philosophy and goals toward protecting ground water
2. Roles and responsibilities of state agencies
3. Legal authority
4. Resources
5. Basis for assessment and planning
6. Monitoring
7. Prevention actions
8. Response to detections of pesticides

9. Enforcement mechanisms
10. Public awareness and participation
11. Information dissemination
12. Records and reporting

The WSDA was selected as the lead agency for development and implementation of state pesticide management plans because it is the state agency responsible for regulating pesticides. The liaison designated by WSDA for formal communications between the EPA and Washington State on state management plans is the Ground Water Quality Protection Manager of WSDA.

[1] From *Safe Drinking Water Act, Section 1429 Ground Water Report to Congress, EPA-86-R-99-016 – October 1999*

CHAPTER 2
STATE'S PHILOSOPHY AND GOALS TOWARD PROTECTING GROUND WATER

In Washington State, ground water quality protection is conducted by several agencies responsible for environmental protection, protection of public drinking water supplies, and management of environmental and public health. Together, programs implemented by these activities constitute a holistic and integrated ground water quality protection program. The mechanisms used by the state to insure that ground water quality is protected are found in the form of linked laws and regulations that employ the concept of antidegradation and the use of a single recognized multi-agency/stakeholder coordination committee known as the Washington State Interagency Ground Water Committee.

WASHINGTON STATE'S COMPREHENSIVE STATE GROUND WATER PROTECTION PLAN

Washington State received endorsement of its Core Comprehensive State Ground Water Protection Program (CSGWPP) in February 2002[2]. The goal of the State of Washington is to protect its ground water resources so that their current and future beneficial uses are ensured. Current and future beneficial uses are related to 1) public health and enjoyment, 2) propagation and protection of wildlife, birds, game, fish, and other aquatic life, and 3) industrial development of the state.

In order to meet this goal, the state outlines mechanisms in a Comprehensive State Ground Water Protection Plan. The three mechanisms are:

1. The Antidegradation Policy;
2. All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART) and,
3. Human health and welfare-based standards which include numeric and narrative standards.

These mechanisms are employed sequentially to establish site-specific ground water protection limits or area-wide land use provisions, which act to ensure the purity of Washington State's ground waters and protect the natural environment.

WASHINGTON STATE'S ANTIDEGRADATION POLICY

Ground water quality protection in Washington State is based upon the concept of anti-degradation, which forms the foundation for the state's ground water protection programs. This concept was originally presented as general policy in the state's overall water quality protection legislation: Chapter 90.48 RCW (Water Pollution Control) and Chapter 90.54

[2] *Washington State Comprehensive State Ground Water Protection Program – Core Program Assessment Document, July 1995*

RCW (Water Resources Act of 1971). The goal of the Antidegradation Policy is to "ensure the purity of the State's ground waters and to protect the natural environment."[3]

The Antidegradation Policy requires ground water quality to be maintained and protected for existing and future beneficial uses. Degradation of ground water quality that would interfere with or become injurious to beneficial uses is not allowed. In addition, degradation of high quality ground waters constituting an outstanding national or state resource, such as waters of national parks and wildlife refuges, and waters of exceptional recreational or ecological significance is prohibited.

Whenever ground waters are of a higher quality than the criteria assigned, the existing water quality must be protected. Contaminants that will reduce the existing water quality are not allowed to enter these waters except in those instances where it can be demonstrated that an overriding consideration of the public interest will be served. All contaminants proposed for entry into ground water must be provided with all known, available, and reasonable methods of prevention, control, and treatment prior to entry.

Washington State's Antidegradation Policy is not a non-degradation policy. . Implementation of the Antidegradation Policy for non-point activities is generally conducted through cooperation and coordination with other agencies and stakeholders. The state of Washington considers education and outreach to be critical elements of its non-point strategy.

ALL KNOWN, AVAILABLE, AND REASONABLE METHODS OF PREVENTION, CONTROL, AND TREATMENT (AKART)

AKART is a process by which any potentially contaminating activity is evaluated in an attempt to limit negative environmental effects. AKART, as utilized in Washington State, consists of two main parts: 1) the evaluation of technical measures to reduce contaminant loading at the point of discharge, and 2) the evaluation of the economic practicality of suggested technical measures.

AKART builds upon the direction of the Antidegradation Policy in that it provides for the determination and implementation of best available methodologies to limit contaminant loading to Washington State's ground water resources. AKART is required to be applied to all known or potential sources of contamination. The effect of AKART upon ground water quality protection is to establish site-specific or area-wide limits on the degree to which the beneficial uses of ground water may be impacted.

For agricultural activities, management practices will be evaluated using the root zone exemption contained in the Ground Water Quality Standards. This exemption provides that the Standards do not apply in the root zone but do apply below the root zone. For agricultural non-point activities, management practices will be evaluated using the root zone concept. In general, agricultural activities will be managed through implementing

[3] Chapter 173-200-030(1) WAC, Water Quality Standards for Ground Waters of the State of Washington

farm management plans; these plans would incorporate State approved Best Management Practices (BMPs) that can protect the saturated zone below the root zone. State approved BMPs are considered one type of AKART for agriculture. As technology and preventive controls are refined to better protect water quality, AKART is also refined. In cases where AKART fails to adequately protect water quality, additional controls must be applied. Where a specific chemical is of concern, WSDA may implement a management plan for that chemical that establishes appropriate conditions for use.

HUMAN HEALTH AND ENVIRONMENTAL BASED STANDARDS

Implementation of the Antidegradation Policy protects background water quality and prevents degradation of Washington State waters beyond established criteria (numerical limits or narrative standards) for contaminants as written in the Water Quality Standards for Ground Waters of the State of Washington. The numerical criteria and narrative standards are based on human health or environmental risk(s) either established by the US EPA, or calculated per Chapter 173-200-040 (2)(c) WAC or Chapter 173-200-050(4) WAC. The Antidegradation Policy applies to both permitted and non-permitted activities. The rule provides for developing enforcement limits and early warning values that will allow preventative action or enforcement to be taken so that criteria or standards will not be exceeded.

Permitted Activities

The policy is implemented for permitted activities by establishing enforcement limits and early warning values based on background water quality and/or AKART. The background quality of ground water dictates the level to which it may be impacted by land use activities. Generally, these limits are set at or below drinking water quality criteria. The effectiveness of these limits is evaluated on a scheduled basis through site-specific environmental monitoring. Exceptions to the limit-setting process occur when ground water quality is so poor that it cannot serve a beneficial use. In this situation, the focus moves from ground water quality protection to ground water remediation in an attempt to recapture lost beneficial uses.

Non-Permitted Activities

The Antidegradation Policy is also implemented for non-permitted or non-point activities through incorporation into BMP's, regulations, guidelines, or policies for non-point activities. These mechanisms are developed through estimation of an aquifer's assimilative capacity. Based on this determination and use of AKART, land use and operational guidelines are developed. These mechanisms are applied (usually at the local government level) towards what has been termed "traditional" non-point activities such as irrigated agriculture, stormwater management and on-site septic system density. It is becoming increasingly common for the effectiveness of BMPs, guidelines, regulations or policies to be evaluated through the federal Clean Water Act, via the establishment of Total Daily Maximum Loads (TMDL's) and/or Safe Drinking Water Act via development of source water protection area plans and assessments.

Since ground water in the state has not been fully characterized, especially the interconnections between aquifers, Washington State classifies all its ground water as a potential source of drinking water, which is generally considered to be the highest beneficial use. It is not necessary for ground water to be defined as an aquifer in order to be protected. Not all ground water is presently used as a drinking water source. However, universal protection of ground water resources is required because of the potential for future use as drinking water. Application of the ground water standards in all ground water-related practices provides this protection. The *Implementation Guidance for the Ground Water Quality Standards* assists agencies and local governments to uniformly administer the Standards in all ground water-related situations.

PESTICIDE MANAGEMENT PLAN PURPOSE, OBJECTIVES AND GOAL

The purpose and objectives of the developed PMP's are:

1. To balance ground water protection with the needs of the agricultural industry;
2. To protect ground water quality in a responsible holistic manner; and
3. To provide guidance and direction for pesticide use in a clear and concise manner that can be adapted as new information is incorporated over time.

The goal of Washington State's PMP is to prevent contamination of ground water by pesticides. In addition, the developed PMP's will prohibit further degradation of ground water that is already contaminated and allow for either active or passive remediation. To accomplish this, WSDA staff will develop PMP's that balance the continued use of those pesticides important to Washington State's agricultural industry with the protection of the state's ground water resources.

CHAPTER 3
ROLES AND RESPONSIBILITIES AND LEGAL AUTHORITIES

The State of Washington has the central role in developing and implementing the state pesticide management plans. WSDA is the responsible state agency for developing and managing the state's pesticide management plans. Specifically, the Water Quality Protection Program housed in the Pesticide Management Division of the agency is responsible for working with commodity groups and stakeholders to evaluate the usage and need for the targeted pesticides, and writing the generic and pesticide-specific plans. To successfully meet the challenges of the generic and pesticide-specific management plans, WSDA will coordinate with federal, state and local agencies. Each agency will have unique roles in the implementation of the plans. Agency coordination and cooperation is essential for effective, efficient, and economical implementation.

In 1997, WSDA developed a Water Quality Protection Program designed to initiate and assist efforts to reduce or prevent pesticide and fertilizer contamination in aquatic environments. The primary focus of the program is to protect ground water. In 1998, the program hired a chemigation and fertigation specialist to develop a chemigation and fertigation technical assistance program based out of Moses Lake, Washington. This program assesses irrigation systems distributing chemicals and fertilizers to make sure they are in compliance with existing rules, and educates growers about good management practices and the state requirements. In 2001, the Program hired a senior level hydrogeologist to oversee the final development and implementation of the PMP and integrate ground water activities with those of the Endangered Species Act unit.

The Water Quality Protection Program staff will use a public process to evaluate pesticide-specific plans. The criteria for evaluation will include the economic impact to agriculture, availability of alternatives, aquifer susceptibility and vulnerability, and impact to minor crops. Throughout this process, WSDA staff will facilitate discussion and coordination of pesticide-specific plans with affected stakeholders who will assist WSDA in determining the compounds for which PMP's will be developed.

The number of agencies involved with pesticide management, ground water protection, agricultural management and the implementation of the state pesticide management Plan process are numerous. Legal authorities and mandates for this protection program come from the EPA and FIFRA. In Washington, WSDA implements FIFRA through a cooperative agreement with EPA, and is responsible for the PMP process.

PROGRAM INTERACTIONS AND INTERRELATIONSHIPS

Understanding program interactions and interrelationships is necessary for proper coordination and consistency. The following is a review of the roles, responsibilities and interactions of the agencies involved with agricultural ground water management.

US FEDERAL GOVERNMENT

The US EPA, US Departments of Agriculture and Interior, the US Geological Survey, and the National Oceanic and Atmospheric Administration are the federal agencies having some role in the PMP process.

U.S. Environmental Protection Agency (EPA)

The EPA regulates pesticide manufacturing, registration, use, storage, disposal, and response to improper pesticide releases. EPA also has the legal authority and responsibility to ensure the protection of the nations ground and surface waters from any type of pesticide contamination. EPA establishes drinking water and surface water quality standards and monitoring requirements, conducts research on health effects and methodology for identifying contaminants, provides technical support to federal, state, and local agencies, develops public education materials and programs, and provides financial assistance to states.

Table 1, Federal Acts Providing PMP Legal Authority

LEGAL AUTHORITY	DEFINITION
U.S.C. §466 et seq. *Clean Water Act of 1972 (CWA)*	This Act is the basis for the protection of the surface and ground waters of the nation. Section 106 of the act provides state water quality protection grants, while section 319 requires states to conduct water quality assessments and develop programs for controlling non-point source pollution. The Office of Ground Water and Drinking Water (OGWDW) implement this law.
U.S.C. §300f et seq. *Safe Drinking Water Act of 1974 (SDWA)*	SDWA provides protection to ground water through drinking water standards and monitoring requirements for pollutants in public water supplies. Subsequent amendments to the SDWA established the Underground Injection Control Program (UIC), The Sole Source Aquifer, the Wellhead Protection and source Water Assessment Programs. The Office of Ground Water and Drinking Water (OGWDW) implements this law.
U.S.C. §136 et seq. *Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)*	Through FIFRA, EPA is able to address the management of pesticides for ground water protection. Through a cooperative agreement, the legal authority is transferred to the state level. The Office of Pesticide Programs (OPP) implements this law.
U.S.C. §6901 et seq. *The Resource Conservation and Recovery Act (RCRA)*	RCRA is the basis for hazardous waste regulation including the disposal of waste pesticides such as canceled, suspended, and unusable pesticide compounds. The Office of Solid Waste (OSW) implements this law.
42 U.S.C. §9601 et seq. *The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*	CERCLA is the basis for the establishment of a fund to deal with contaminated sites. CERCLA provides for the recovery of damages from liable parties involved with contamination. The Office of Emergency and Remedial Response (OERR) implements the law.

The EPA currently administers five environmental statutes affecting ground water protection programs. The federal laws having the greatest impact on the state's pesticide management planning are FIFRA, the Clean Water Act (CWA), The Safe Drinking Water

Act (SDWA), the Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). EPA focuses on the use of FIFRA authorities to address concerns about pesticide contamination of ground water. The following is a summary of the EPA federal acts providing the legal authority for the implementation of the PMP.

Role in this Plan:

1. Provide written guidance documents to assist in writing and implementing generic and pesticide-specific management plans.

2. Provide expertise and interpretation of federal laws relevant to PMP planning.

3. Provide coordination between EPA's pesticide and water programs at the regional level, especially in the area of grant funding resources.

4. Review, comment on, and approve Washington's generic PMP and any pesticide-specific PMPs submitted.

U.S. Department Of Agriculture (USDA)

Through a number of agencies, USDA provides both technical assistance to individual landowners and a range of incentives affecting the way landowners choose to manage their land and water resources. USDA conducts this business through the Natural Resource Conservation Service (NRCS). USDA also conducts agricultural research through the National Agricultural Statistics Service (NASS). The U.S. Forest Service (USFS) manages federal forest-lands for multiple uses. The following is a description of the USDA agencies applicable to the PMP.

Table 2: Agencies Under the USDA

AGENCY	LEGAL AUTHORITIES	EXISTING PROGRAMS
Natural Resources Conservation Service (NRCS)	None	Environmental Quality Incentive Program (EQIP) provides technical support and cost share for protection practices implemented in high priority areas of state. May be utilized to implement preventative steps under PMPs.
National Agricultural Statistics Service (NASS)	None	Conducts hundreds of surveys and prepares reports annually covering production, prices, farm labor, and other aspects of the industry.
United States Forest Service (USFS)	None	Ongoing noxious weed control work

USDA Natural Resources Conservation Service (NRCS)

The Natural Resources Conservation Service (NRCS) provides education and technical assistance on soil and water conservation practices both directly to users and through local conservation districts. NRCS assists in developing farm management plans. It participates

in developing state Best Management Practices (BMPs) for pest management, as well as other pertinent technical standards including containment facilities, well testing and well abandonment. NRCS provides expertise in agricultural practices, watershed planning and ground water and surface water protection.

Role in this Plan:

1. Provide technical assistance to land owners and soil and water conservation districts as a part of the implementation of the PMPs.

2. Incorporate into their processes and documents, where appropriate, components of the generic and pesticide-specific PMPs. NRCS will coordinate with WSDA to ensure conservation compliance plans are not in conflict with PMPs.

3. Provide technical assistance to the state on existing and new developments related to pesticide and irrigation water management standards.

National Agricultural Statistics Service (NASS)

The NASS compiles statistics on agricultural production nationally, including the number of acres planted of certain crops in the state. Additionally, the NASS designs scientifically valid surveys to acquire agricultural information. NASS has 46 State Statistical Offices that publish data about many of the same topics for local audiences. Cooperative agreements with state governments permit preparation and publication of county-level estimates of crops and livestock for many states. In addition, many field offices conduct surveys for other government agencies and private organizations.

The Washington State field office is the Washington Agricultural Statistics Service, located in Olympia, Washington. Field offices collect, verify, and analyze data used to prepare statistical estimates. Farmers, ranchers and agribusinesses are the grassroots source of information, collected through voluntary surveys conducted by the state office throughout the year. Survey data are then summarized at the state level to provide statistical indications. Each state office then makes recommendations to the national headquarters in Washington, D.C.

Since 1993, NASS has compiled on-farm agricultural chemical use statistics funded through the Water Quality Initiative. The Water Quality Initiative is a multi-agency program designed to provide information for farmers, ranchers and foresters to address on-farm and off-farm environmental issues. NASS collects on-farm agricultural chemical use information to support the evaluation of water quality and food safety issues. This information can be useful in vulnerability assessment where large acreage of certain crops are concentrated in a geographic area.

Role in this plan:

The Washington Agricultural Statistics Service works with WSDA staff to determine new research needs related to Washington's pesticide management plans.

1. Summarize and report to WSDA staff relevant research related to state pesticide management plans.

2. Work to provide presentations of research results related to state pesticide management plans to WSDA, other agencies, and the agricultural community.

United State Forest Service (USFS)

The USFS manages forestlands for multiple use. Their responsibility includes protecting timber resources, controlling tree pests and noxious weeds, and writing National Forest planning documents. They also have a responsibility to ensure applicators are licensed, and pesticides are applied to forestlands in a safe and proper manner.

Role in this Plan:
Implement existing plant protection and weed control programs consistent with the PMPs.

U.S. Department of Interior (DOI)

The U.S. Department of Interior (DOI) has several agencies with natural resource management roles in Washington State. The DOI agencies in Washington include the U.S. Geological Survey (USGS), Bureau of Land Management (BLM), and the Fish and Wildlife Service (FWS). Each agency has specific land and resource management roles and authorities. Each agency also has specific responsibilities with pesticides and the environment.

Table 3: Agencies Under the DOI

AGENCY	LEGAL AUTHORITIES	EXISTING PROGRAMS
US Geological Survey (USGS)	None	Through cooperative programs with states, USGS compiles information for planning, developing, and managing the nation's ground water resources.
Bureau of Land Management (BLM)	None	Ongoing adherence to pesticide use and application and noxious weed control laws.
Bureau of Reclamation	None	Manages, develops and protects water in BOR projects in many western states.
US Fish and Wildlife Service (FWS)	None	Required under the ESA to develop recovery plans for listed species under their jurisdiction.

U.S. Geological Survey (USGS)

The USGS has the principal role for gathering hydrologic information on and assessing the quality of the nation's ground and surface water. In Washington, the USGS has conducted many pesticide and ground water monitoring and assessment projects. In 1986, Congress

appropriated funds for the USGS to begin the National Water Quality Assessment (NAWQA) Program.

In 1999, USGS contracted with WSDA to conduct atrazine and ground water probability mapping. The USGS has been collecting geographical information system (GIS) data layers and evaluating aquifer vulnerability for nutrients and pesticides. WSDA will utilize USGS expertise in evaluating pesticide leaching probability. USGS and Ecology contracted with WSDA to produce an aquifer vulnerably map. This vulnerability map will be a key tool for identifying sensitive areas and regulating atrazine, along with other similar leachable agricultural chemicals, to protect ground water quality.

Role in this Plan:
Under WSDA's cooperative agreement with EPA, WSDA acquired funds for the production of a pesticide-specific vulnerability map for fiscal years 2000 and 2001.

1. Retain role as unbiased professional resource for conducting soil and ground water monitoring evaluation projects, data evaluation associated with pesticide contamination problems in various parts of Washington, pesticide and ground water monitoring, and pesticide probability mapping.

2. Continue to evaluate and supply data associated with the NAWQA program.

Bureau of Land Management (BLM)

The Bureau of Land Management (BLM) has the authority to manage public BLM lands for multiple uses. Pesticides are used on BLM lands for weed control and other pest control purposes. Improper and illegal disposal of waste pesticides and containers have created environmental and health concerns. Applications of pesticides on BLM lands need to be done safely and in a manner to protect ground water quality.

Role in this Plan:
1. Implement existing weed and pest control programs consistent with the PMPs.

Bureau of Reclamation (BOR)

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Role in this Plan:
1. Work with irrigation districts in the management of irrigation water and water quality

US Fish and Wildlife Service (FWS)

The Pacific Region includes the regional office in Portland, Oregon, 105 national wildlife refuges, 19 national fish hatcheries, 8 ecological services field offices, and 20 law enforcement offices including the National Forensics Laboratory. In addition, there are nine

fisheries resources offices located in California, Hawaii, Nevada, Oregon, Washington, and the U.S. Trust Territories in the Pacific Ocean.

The Pacific Region is engaged in numerous programs to fulfill the Service's mission "to conserve, protect, and enhance fish and wildlife and their habitat for the continuing benefit of the American people." Within Washington state, the FWS mission is to protect and restore wetland and upland habitats, study the effects of contaminants on "trust" resources such as migratory birds, and provide input on wetland permits or licenses for hydroelectric projects. In addition, the FWS protects and restores endangered and threatened species throughout Washington State.

The FWS and the National Marine Fisheries Service described below are required under the Endangered Species Act (ESA) to develop recovery plans for listed species in their jurisdiction. They also review the plans and actions taken by the state and local governments and grant certain protections under the ESA. The Services are required to develop the biological standards and to describe how they will determine when fish are recovered. Because of the multiple listings in Washington State, both agencies are heavily involved with the salmon recovery process.

Role in this Plan:

1. Work with WSDA to identify areas sensitive to endangered and threatened species and their habitats and provide guidance as necessary.

National Oceanic and Atmospheric Administration (NOAA)

The National Oceanic and Atmospheric Administration (NOAA) administer programs that achieve the domestic and international conservation and management of living marine resources. The National Marine Fisheries Service is a part of NOAA.

Table 4: Agencies Under the NOAA

AGENCY	LEGAL AUTHORITIES	EXISTING PROGRAMS
National Marine Fisheries Service (NMFS)	None	Required under the ESA to develop recovery plans for listed species under their jurisdiction.

National Marine Fisheries Service (NMFS)

The National Marine Fisheries Service (NMFS) provides services and products to support domestic and international fisheries management operations, fisheries development, trade and industry assistance activities, enforcement, species and habitat conservation operations, and the scientific and technical aspects of NOAA's marine fisheries program.

In the Northwest, NMFS is responsible for ensuring salmon recovery. They have identified the factors contributing to the decline of salmon such as lack of cold, clean water and improper forest and agriculture practices. NMFS is responsible for enacting

regulations to prohibit activities contributing to the decline of salmon, such as the feasibility of breaching any or all of the eight dams along the Lower Snake and Columbia Rivers. They are also responsible for developing a salmon recovery plan at the federal level.

Presently, NMFS is addressing the pesticide and Endangered Species Act (ESA) issue on two levels. First on the scientific level; NMFS is conducting research to determine if pesticides are affecting Northwest salmonid species. They are using various neurological screens to identify if sub-lethal effects on salmon, measured using environmentally relevant concentrations, impair the biological requirements of the species. Second, on the policy level; NMFS has stated in the final 4(d) rule (50 CFR Part 223, 10 July 2000) that "…NMFS does not currently have specific information on the potential effects on listed salmonids of a very large number of pesticide products currently in use." As a result, NMFS has stated it will work with the appropriate state and federal agencies to address pesticide issues related to the Clean Water Act and the ESA.

Role in this Plan:

1. Work with WSDA to identify areas sensitive to endangered and threatened species and their habitats and incorporate identified protective measures into PMPs.

WASHINGTON STATE GOVERNMENT

Along with the Washington State Department of Agriculture, the state departments of Ecology, Health, the Washington State Conservation Commission, and the Washington State University contain branches or programs that have some role in the PMP process. WSDA intends to use the Interagency Ground Water Committee as the primary interagency coordination mechanism for the state pesticide management planning process.

Interagency Ground Water Committee (IGWC)

The Washington State Departments of Ecology, Agriculture and Health established the Interagency Ground Water Committee in 1989. The committee is composed of federal, state and local agencies and organizations involved in water quality issues. Members include EPA, WSDA, US Geological Survey, WSU Cooperative Extension, Natural Resources Conservation Service, Department of Health, Department of Fish and Wildlife, Department of Natural Resources, and the Washington Conservation Commission. Representatives of local governments and private businesses also participate on the committee. In relation to the PMP development process, the IGWC will facilitate interagency communication on water quality and quantity issues, and coordinate implementation of water quality programs. Additionally, the IGWC will provide WSDA with a peer review mechanism for key sections of pesticide specific management plans including but not limited to site-specific monitoring strategies, pesticide transport mechanisms, and BMPs related to irrigation water management as it affects pesticide transport through the vadose zone.

Washington State Department of Agriculture (WSDA)

WSDA implements FIFRA through a cooperative agreement with EPA. WSDA has the authority to regulate pesticides through the state's pesticide laws and rules. The agency's Pesticide Management Division is charged with the registration of pesticide products, education and licensing of applicators, enforcement, and ground water protection.

Table 5: State Laws and Rules Governing Pesticides in Ground Water

LEGAL AUTHORITY	DEFINITION
Chapter 15.58 RCW Washington Pesticide Control Act	WSDA has broad authority to regulate pesticide distribution and use in Washington State. WSDA can also prohibit the use of a product or active ingredient statewide.
Chapter 17.21 RCW Washington Pesticide Application Act	WSDA has the ability to control methods of applications and timing of applications, require permits for applications in certain areas, set maximum use rates, or prohibit the use of pesticides in geographical areas at certain times of the year.
WAC 16-228 General Pesticide Rules	This list contains state restricted use pesticides posing a risk to ground water. These pesticides can only be purchased or used by certified applicators. Currently, the list consists of nineteen active ingredients. The rules also contain requirements for pesticide application record keeping.
WAC 16-230-520	Prohibits the use of Picloram within a certain geographical area of Spokane County for the protection of ground water.
WAC 16-229 Secondary Containment Rules	Require facilities used for storage of large quantities of bulk pesticides and fertilizers be built and maintained to contain spills and prevent their release to the environment. Containment of pesticides at permanent mixing/loading sites is also required.
WAC 16-100 and 16-200 Chemigation and Fertigation rules	Establishes performance standards for the delivery of pesticides and fertilizers through irrigation systems.

WSDA has authority to prevent contamination of ground water from pesticides statutorily through Washington's Pesticide Control and Pesticide Application Acts. Additionally, WSDA has the authority to use the state's Ground Water Quality Standards to implement protective measures.

WSDA is obligated by RCW 90.48.010 and WAC 173-200-010(2) to use the Ground Water Quality Standards in its ground water protection decision-making. *Implementation Guidance for the Ground Water Quality Standards* (page 6) states:

> Implementation and enforcement of the Ground Water Quality Standards for general agricultural activities will be handled through a memorandum of understanding (MOU) with the Department of Agriculture, [WAC 173-200-080(7)(b)]. This MOU will be developed consistent with the strategy "Protecting Ground Water: A Strategy for Managing Agricultural Pesticides and Nutrients", (Washington State Department of Ecology, 1992). Currently there is also a memorandum of agreement between the Department of Ecology and the Washington State Conservation

Commission that describes how complaints on water quality violations will be managed.

WSDA, Department of Health, and Ecology did enter into a MOU in 1987 that recognized WSDA's responsibility to regulate pesticide use in implementing the State Ground Water Quality Management Strategy. The 1987 MOU directed WSDA, DOH, and Ecology to develop specific implementing agreements for the adoption of ground water quality standards, identification of potentially polluting activities, modification or adoption of control mechanisms, program support and evaluation, and technical assistance and training. This Generic PMP now serves as an implementing agreement under that MOU.

Existing Programs

WSDA has a number of existing programs protecting the integrity of Washington's ground water resources. These programs vary in origin and scope, and are regulatory, planning or voluntary-compliance based. The key programs include pesticide enforcement, pesticide registration, applicator certification and licensing, water quality protection, and waste pesticide disposal.

Enforcement

WSDA administers a comprehensive pesticide enforcement program to ensure compliance with FIFRA and Washington pesticide laws and rules. Enforcement staff is located statewide and work with applicators, citizens, and the industry in general. Staff conduct routine inspections and respond to misuse complaints.

Pesticide Registration

All pesticides sold or used in Washington must be registered by both EPA and WSDA. These pesticides may either be registered as restricted use, general use, or state restricted use. In addition to routine registration, products are reviewed for Experimental Use Permits, Special Local Needs registrations under Section 24c of FIFRA, and Emergency Exemptions from registration under Section 18 of FIFRA.

General use pesticides are commonly found in home and garden, home improvement, and other retail stores. They may be bought and used by the general public on their own or by commercial applicators as long as worker protection measures are followed. Restricted use pesticides may be sold only by licensed pesticide dealers and may be purchased and used only by licensed pesticide applicators. State restricted use pesticides also may only be used by properly licensed applicators. All pesticides must be applied in accordance with their labels.

Applicator Certification and Licensing

To ensure pesticides are used properly, WSDA enacted rules relating to the certification and licensing of pesticide applicators. Applicators must be licensed to:

- Use or supervise the use of any restricted pesticide;
- Make commercial applications of general use pesticides; or
- Apply a pesticide in connection with their duties as an employee of federal, state or local government.

The certification program includes several exams related to specific subjects.

Waste Pesticide Disposal Program

In 1988, WSDA created a Waste Pesticide Disposal Program to provide for the proper disposal of unusable, and canceled pesticides. The goal of the program is to remove these pesticides from storage facilities to reduce potential impacts to human health, and the environment. To date the program has disposed of over a million pounds of waste pesticides.

Pesticide Application Record Keeping

Certified commercial applicators and all people applying a pesticide to more than one acre are required to keep records of their applications. Some of the key information that will be valuable for ground water protection efforts include: the product name, the amount applied, the date of application, and the geographic location. These records must be kept for seven years. Pesticide dealers are also required to keep records of pesticide sales except those chemicals used for home and garden. WSDA has found that collecting this information from pesticide users in a local area is expensive and will reserve this tool for areas of significant concern. If additional information is needed, such as irrigation practices or rainfall events after application, new rule-making would be required.

Water Quality Protection Program

The WSDA Water Quality Protection Program is the program responsible for working with the regulatory, environmental and agricultural communities in developing the generic and pesticide-specific management plans. Water quality staff develops, implements and maintains the PMPs, and communicates regularly with EPA staff and stakeholders.

In addition, the water quality program addresses a variety of surface and ground water issues involving fertilizers and pesticides. The goal of this program is to work together with the agricultural community and regulators to protect water resources. Staff participates in several joint projects with other agencies and organizations to encourage the proper use of fertilizers and pesticides in aquatic environments.

In 1998, the water quality program implemented a Fertigation and Chemigation Technical Assistance Program based out of Moses Lake, Washington. A Fertigation Technical Assistance Specialist and a Chemigation Compliance Specialist who work with the agricultural community to educate growers about good management practices and the state requirements staff this program.

Role in this Plan:

1. Regulate pesticides to minimize the potential for ground water contamination.

2. Continue to provide education to pesticide applicators through its certification and training programs.

3. Serve as lead agency for developing, implementing, and enforcing state pesticide management plans, and act as the liaison between federal, state and agricultural interests. Coordinate the PMP process through the Interagency Ground Water Committee.

4. Coordinate the development and implementation of pesticide ground water monitoring efforts with Ecology.

5. Coordinate with the Department of Health to provide toxicological data and health-based information to individuals potentially impacted by pesticides in ground water.

6. Seek Memoranda of Understanding as needed with agencies or private sector groups involved with implementation of the PMP.

7. Coordinate with Ecology in implementing response actions when pesticide ground water contamination is detected. WSDA will assist in identifying appropriate and enforceable methods for mitigating the problem.

8. Seek funding for PMP implementation, including working with the agrichemical industry to fund monitoring, education and other PMP activities.

9. Continue to assist pesticide users in the proper disposal of waste pesticides.

10. Select voluntary management measures consistent with the State Ground Water Quality Standards.

Washington State Department of Ecology (Ecology)

The Washington State Department of Ecology (Ecology) has the primary responsibility and authority for protecting the state's ground water and surface water quality. Ecology administers enforcement of the federal Clean Water Act and state water quality laws and rules. Additionally, the department is authorized to implement RCRA, and works in conjunction with the federal CERCLA program, and has authority for the Underground Injection Control Program section of the federal Safe Drinking Water Act of 1974. Three major laws and one rule provide Ecology with the framework to accomplish this task.

In addition, eight water quality and/or quantity related laws are listed in Table Six.

Table 6: The Department of Ecology's Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 90.44 RCW Regulation of Public Ground Waters Act	Extended the state's surface water statutes to ground water. It was amended in 1985 to create a comprehensive process for ground water management through the Ground Water Management Areas.
Chapter 90.48 RCW Water Pollution Control Act	Provides the principal statutory authority for Washington's water quality programs. This includes the authority to administer programs of the federal Clean Water Act. It also allowed the adoption of statewide ground water quality standards in 1990 and the establishment of the antidegradation policy reflected in those standards
Chapter 90.54 RCW Water Resources Act of 1971	Addresses fundamental water resource policy to ensure that waters of the state are protected and fully utilized for the greatest benefit.
WAC 173-200 Water Quality Standards for Ground Waters of the State of Washington	Protects and preserves ground water quality from both point and nonpoint sources, and provides a means for enforcement limits to be set for contaminants having an MCL and for those that do not. Also describes the state's antidegradation policy, defining state's philosophy towards the protection of its ground water resources.
State Shoreline Management Act of 1971	Finds equitable balance between uses allowing for reasonable development and economic activity while affording preference to preserving the public's access and enjoyment of the state's shorelines
Model Toxics Control Act (MTCA), Chapter 70.105D RCW and it's associated Rule, Chapter 173-340 WAC	Deals with the investigation, monitoring and cleanup of toxic waste sites. Contains the Ground Water cleanup standards.
Chapter 18.104 RCW Water Well Construction Act	Provides for the regulation and licensing of well contractors and operators and the regulation of well design and construction.
Chapter 90.52 RCW Pollution Disclosure Act	Provides for the filing of reports to Ecology of waste discharges into the waters of the state and the air of the state from industrial or commercial operations.
Chapter 70.105 RCW Hazardous Waste Management Act	Regulates hazardous and dangerous waste management facilities and generation facilities.
Chapter 43.21 RCW State Environmental Policy Act	Provides for a public review and comment process for all new projects that may potentially impact the environment.
Chapter 70.146 RCW Centennial Clean Water Fund	Provides grants to fund projects supportive of the Clean Water Act requirements.

Existing Programs

Several Ecology program areas will have some involvement in the PMP including the Water Quality, Water Resources, Toxics Clean-Up, and the Hazardous Waste and Toxics Reduction Program.

Water Quality Program

The Water Quality Program administers the agency's water quality programs. These include NPDES permits, non-point source pollution, state waste discharge permits and the Underground Injection Control Program. The program developed Washington's Comprehensive State Ground Water Protection Program (CSGWPP). Additionally, the Program may use its authority under Chapter 173-200 WAC to designate "Special Protection Areas" to protect sensitive ground water.

Water Resources Program

The Water Resources Program determines surface and ground water rights and appropriations. The program sets water resource policy, promotes conservation and administers the Ground Water Management Area Program described at the end of this chapter. This program is intended to foster ground water protection through grass roots planning and designation of "protection areas" limiting certain activities. The water resources program also oversees regulation and enforcement of state water well construction and abandonment.

Toxic Clean-Up Program

This program administers the State's Model Toxics Control Act (Washington's Superfund). Eighty percent of the clean-up activities currently underway are ground water related. A majority of these actions are being conducted at old disposal facilities (either solid or dangerous waste). This program is strictly reactive in nature and does not promote prevention.

Hazardous Waste and Toxics Reduction Program

Dangerous waste management facilities and generation facilities are administered under this program. Ground water is monitored in and around all treatment, storage, or disposal facilities as well as selected generation facilities shown to be at risk for ground water contamination. Ground water clean-up is conducted through the corrective action clauses of RCRA. Ecology's pesticide activities are conducted within this program. This program places a major emphasis on pollution prevention, technical assistance and outreach activities.

Role in this Plan:

1. Provide expertise on Ecology laws, rules and policies. In addition, provide expertise in hydrogeology and available information on aquifer characterization and mapping.

2. Provide data from Ecology water quality databases, interpret the data and continue work on standardizing data to be consistent with EPA's minimum set of data elements.

3. Coordinate monitoring projects related to pesticides and nonpoint source impacts through the Interagency Ground Water Committee.

4. Ensure the pesticide-specific management plans are consistent with the CSGWPP and with plans developed under the Coastal Zone Management Act.

5. Provide coordination with grants for possible funding of projects relevant to PMPs including education and technical assistance programs.

6. Establishment of Ground Water Management Areas.

7. Cooperate with WSDA in the investigation and enforcement of illegal pesticide disposal.

Washington State Department of Health (DOH)

The Department of Health (DOH) has the primary responsibility for the protection of public health and general oversight and planning for all the state's public health activities. The DOH is responsible for implementing the federal Safe Drinking Water Act and its associated rules, and is the lead agency for development of the state Wellhead Protection Program. DOH conducts human health risk analysis, sets human health standards for drinking water, regulates public drinking water systems and enforces rules.

The State Board of Health is appointed by the governor and has authority in several areas pertaining to drinking and ground water. In these cases the DOH enforces Board of Health rules and administers the programs.

Existing Programs

The DOH Office of Toxic Substances provides health advisories when none are available from the federal government and pesticide fact sheets explaining the meaning of analytical results sent to well owners. The Office of Toxic Substances as well as the Drinking Water Program and the Wellhead Protection Program have some involvement in the PMP process.

The Drinking Water Program

The Drinking Water Program ensures public water systems comply with drinking water standards and other provisions of the SDWA. This program requires public water supply systems to test their water for bacteria and toxic chemicals. The Office of Toxic Substances assesses public health impacts from hazardous substances found in water that may be used for drinking and other human uses. This program chairs and administers the Pesticide Incident Reporting and Tracking Review Panel (PIRT).

PIRT was created to serve as a scientific body to review pesticide issues and make recommendations to the state legislature and other agencies. The panel is convened by the DOH and includes representatives from the departments of Agriculture, Ecology, Health, Labor and Industries, Fishery and Wildlife and Natural Resources. The panel also has representatives from the University of Washington, WSU Cooperative Extension, the Poison Control Network, a toxicologist and a private citizen. The panel's responsibilities include reviewing and making recommendations for procedures for investigating pesticide incidents, monitoring response times to pesticide incidents and evaluating the adequacy of the laws aimed at protecting the public health from pesticides. The PIRT panel submits an annual report to the state legislature.

Table 7: The Department of Health's Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 43.20 RCW	DOH administers the federal Safe Drinking Water Act and its associated rules WAC 246-290 Public Water Supplies and WAC 246-291 Group B Public Water Systems.
WAC 246-290 Public Water Supplies and WAC 246-291 Group B Public Water Systems	Gives DOH authority to regulate public drinking water supplies. Regulation requires public water systems to monitor for certain pesticides. DOH has authority to add compounds to those mandated by the federal government.
Chapter 70.142 RCW Chemical Contaminants and Water Quality	Allows the establishment of standards for chemical contaminants in drinking water by the state Board of Health.
WAC 246-290 Wellhead Protection Program.	Establishes wellhead protection.
Chapter 43.70 RCW Department of Health	Establishes DOH and its mission.
Chapter 70.05 RCW	Establishes local health departments, boards, officers and regulations.
Chapter 70.104 RCW Pesticides-Health Hazards	Establishes pesticides-health hazards.
Chapter 70.116 RCW Public Water System Coordination Act of 1977	Establishes public water system coordination
Chapter 70.119 RCW Public Water Supply Systems-Certification and Regulation of Operators.	Establishes certification and regulation standards for public water supply systems operators.
Chapter 70.104 RCW	Creates the Pesticide Incident Reporting and Tracking (PIRT) Review Panel.

Wellhead and Source Water Protection Programs

In Washington, DOH administers the state's Wellhead Protection Program. The 1986 Amendments to the SDWA mandates states develop wellhead protection programs for all federally defined public water systems using ground water as their source. Federally defined public water systems are all public systems serving more than 25 persons or 15 connections.

The 1996 amendments to the federal Safe Drinking Water Act established the Source Water Assessment and Protection Program. Under this program both ground and surface water sources of drinking water are assessed and protected.

Role in this Plan:

1. Provide expertise on DOH laws, rules and policies as well as wellhead protection, hydrogeology and ground water vulnerability. In addition, provide expertise in toxicology and human health risk assessment relevant to PMP pesticides.

2. Provide data from the statewide assessment project of public water systems mandated by SWDA, and expertise in public health policy as related to the PMP process.

3. Chair and administer PIRT, and supply information relevant to the PMP process.

4. Participate on the IGWC, and facilitate participation of local health departments and water purveyors in PMP planning.

Washington State Conservation Commission (WCC)

The Washington State Conservation Commission (WCC) and individual Conservation Districts are authorized by the Conservation District Law of 1939, revised in 1973. The Conservation Commission is responsible for managing the administrative, legal and programmatic activities of 48 conservation districts throughout the state.

Table 8: The Washington State Conservation Commission's Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 89.08.005 RCW Conservation District Law of 1939, revised in 1973	Administers the legal and program activities of the 48 conservation districts in the state, and provides assistance where needed.

Existing Programs

Conservation districts are non-regulatory, local entities that work closely with NRCS. These districts provide technical assistance to farmers developing farm management plans to implement soil and water conservation practices. The districts help farmers write and implement farm plans that take a holistic approach to environmental issues at the individual farm level. The goal of these districts is to work with local governments and landowners to promote conservation and improvement of renewable resources. Conservation districts provide education for voluntary implementation of BMPs. Many conservation districts are involved in surface and ground water planning and some are conducting studies related to ground water quality.

Role in this Plan:
1. Serve as liaison with the state's conservation districts.

2. Participate in PMP development and on-farm implementation.

3. Provide expertise in local agricultural practices, and education and technical assistance to farmers at the local level.

4. Participate on the IGWC.

WSU Cooperative Extension

Washington State University Cooperative Extension (Cooperative Extension) develops and implements a wide range of educational programs and resource materials for scientific, research-based pest and nutrient management for pesticide user groups, including farmers

and homeowners. Cooperative Extension specialists work closely with WSDA's Licensing and Recertification Program. Cooperative Extension has traditionally been involved in education for Washington agriculture, forestry and others using pesticides. Extension educators in all counties work with individuals as well as with groups to transfer knowledge from WSU statewide. This includes new developments in environmental areas such as BMPs for surface and ground water protection.

Table 9: WSU's Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 28B.07 RCW WA Higher Education Facilities Authority	To improve and ensure the quality and range of educational services available to the citizens of this state.

Existing Programs

WSU Cooperative Extension has an important role to play in the educational and non-regulatory elements of a comprehensive ground water protection plan. Washington State University conducts research in many areas of pesticide use, some studies relating specifically to ground water protection. This information is disseminated through extension programs.

Pre-License Training and Recertification

Extension organizes annual pre-licensing and recertification courses for farmers and other pesticide user groups throughout the state. For the last several years' water quality issues have risen in priority resulting in ground water protection as an agenda item at many of these meetings. WSDA water quality staff present information at many of these courses annually.

Home•A•Syst Program

Cooperative Extension developed and is implementing a Home•A•Syst Program for the state. This educational program provides farmers and homeowners with tools to evaluate how their current practices may threaten ground water. Resource materials include pesticide management practices for protecting surface and ground water from contamination. Recently the Home•A•Syst Program has been significantly reduced due to budget cuts and loss of the program's administrator.

The Food and Environmental Quality Laboratory (FEQL)

The Food and Environmental Quality Laboratory (FEQL) is involved in graduate level education in a broad range of research involving agrichemical issues. The Laboratory performs a variety of agrichemical research including field-testing of pesticide efficacy, crop chemical residues and determination of environmental fate and distribution of pesticides. FEQL also provides extension service to the community on issues such as food quality, ground water contamination, alternative pest control practices and other environmental

issues. The laboratory facility is equipped for analysis of nearly all commercial pesticides and metabolites.

Laboratory faculty has expertise in toxicological evaluations of agrichemicals and their metabolites, assessment of risk, remediation of pesticide waste in soil, best management practices for surface and ground water protection, food safety, minor crop and pesticide registration issues and many other areas. The laboratory publishes a monthly newsletter titled "Agrichemical and Environmental News".

WSU Agricultural Research Center (ARC)

The Agricultural Research Center (ARC) conducts research on the movement and breakdown of pesticides and nutrients in water and soil under conventional and alternative agricultural practices. ARC is the research facility of the College of Agriculture and Home Economics. Individual and teams of scientists within the center conduct the research.

Role in this Plan:

1. Develop and implement BMPs through educational programs.
2. Supply information regarding pesticide use, contamination prevention, and monitoring results through the WSU pesticide education and recertification program.

3. Develop simulation models for personal computers that teach pesticide movement and management principles.

4. Participate on the IGWC.

5. Provide expertise in agricultural practices, soils and pesticide interactions, ground water vulnerability and integrated pest management. Also provide expertise in sustainable agriculture, remediation research and education, and irrigation management.

6. The FEQL will provide expertise in minor crops, environmental toxicology, agricultural practices, BMPs, alternative pest management, risk assessment and public education.

7. The ARC will provide technical information on pesticide movement and breakdown in soils and water.

The Salmon Recovery Office (SRO)

The Governor's Salmon Recovery Office was established by the Legislature through the Salmon Recovery Planning Act in 1998. The Salmon Office supports the Governor's Joint Natural Resources Cabinet (JNRC). Many of the salmon recovery efforts occur through three work products:

- A statewide strategy to recover salmon,

- A state agencies' action plan, and
- A salmon recovery scorecard.

The JNRC released the *Statewide Strategy to Recover Salmon* in September 1999, following an earlier draft. The Strategy was designed as a long-term guide for salmon recovery. The *State Agencies' Action Plan* released in May 2000, defines the state's priority activities for short-term implementation of the Salmon Strategy. The action plan focuses on new actions or modifications to existing activities providing additional protection for salmon. Finally, the *Salmon Recovery Scorecard* is the state's business plan for salmon recovery. It's a performance management system for tracking data, measuring progress and changing course where needed. The JNRC released the first draft in November 1999 and again in May 2000.

Table 10: The SRO Statutory Authority

LEGAL AUTHORITY	DEFINITION
Salmon Recovery Planning Act of 1998	Establishes the Salmon Recovery Office.

Although the Salmon Recovery Office has no specific legal authority or existing program relevant to the PMP process, the Salmon Recovery Office may be able to provide information on endangered and threatened salmon and habitat for PMP planning.

Washington State Department of Natural Resources (DNR)

The Washington State Department of Natural Resources (DNR) oversees the management of approximately five million acres of forest, agricultural, urban and aquatic lands in the state. The department issues permits for pesticide use on forestlands, including Christmas tree plantations, in the state. Although DNR has no specific legal authority or existing program relevant to the PMP process, DNR may be able to provide expertise on pesticide issues related to forestry, and the permitting of pesticide applications on forestlands, including Christmas trees.

Washington State Department of Community Trade and Economic Development (CTED)

The Washington State Department of Community, Trade and Economic Development (CTED) provides financial and technical assistance to local government and community based non-profit organizations. CTED assists local governments in implementing requirements of the Growth Management Act. This includes requirements to identify critical aquifer recharge areas used for potable water and to protect these areas through comprehensive plans and land use plans. Although CTED has no specific legal authority or existing program relevant to the PMP process, CTED may be able to provide information and expertise on the Growth Management Act and how it can interact with PMP planning.

LOCAL GOVERNMENT, BOARDS AND PLANNING UNITS

Local governments can provide information on local conditions and activities. The Growth Management Act and other planning efforts have generated data on the vulnerability of the drinking water supply. The availability of information varies from county to county. The state agencies will work with local governments when possible, taking advantage of their knowledge of local conditions and people. Local health and planning agencies have become more involved recently in ground water quality, including the impact of agricultural activities on ground water resources.

The Pesticide Advisory Board

The Pesticide Advisory Board was created under The Washington Pesticide Application Act to advise the director of the WSDA on problems relating to the use of pesticides. Since the Board was first created, members of the board have included licensed pesticide applicators and producers, licensed pest control consultants, licensed pesticide dealer managers, entomologists, toxicologists and health care practitioners, pesticide coordinators from WSU, representatives of the agricultural chemical and food processing industries, agricultural labor, and the environmental community. In addition, nonvoting members include the Assistant Director of WSDA's Pesticide Management Division and representatives from the state departments of Labor and Industries, Health, Fish and Wildlife, Natural Resources, and Ecology.

Table 11: The Pesticide Advisory Board Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 17.21 RCW The Washington Pesticide Application Act	Advises the Director of WSDA on problems relating to the use of pesticides.

Although the Pesticide Advisory Board has no specific legal authority or existing program relevant to the PMP process, the Pesticide Advisory Board may be able to advise WSDA of problems relating to the use of pesticides.

Ground Water Management Areas (GWMA)

The Ground Water Management Area legislation provides for a mechanism that is intended to be a comprehensive approach to ground water protection developed and implemented at the local level with state oversight and assistance. The intent of a GWMA is to establish procedures for ground water management consistent with both local needs and state water resource policies and management objectives. Local advisory committees develop the ground water management plans with technical and planning assistance from the state.

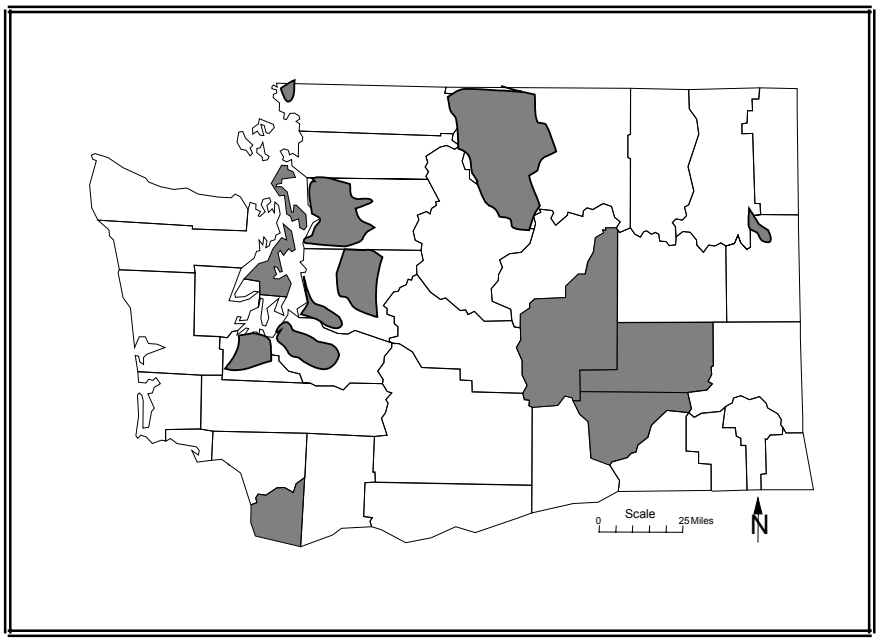
Table 12: The Ground Water Management Area Statutory Authority

LEGAL AUTHORITY	DEFINITION
Chapter 90.44.400 RCW Ground Water Management Areas and Chapter 173-100 WAC	Establishes procedures for ground water management that are consistent with both local needs and state water resource policies and management objectives. Sets forth the process, standards and criteria for ground water management area designation and the development of ground water management programs.

Existing GWMAs

There are 15 Ground Water Management Areas statewide. One of the most active GWMAs in an agricultural area is the Columbia Basin GWMA.

Figure 4: GROUND WATER MANAGEMENT AREAS



Columbia Basin Ground Water Management Area

Concerned about elevated nitrates in ground water, Adams, Franklin and Grant counties petitioned Ecology in 1997 to form the Columbia Basin GWMA. Ecology signed the order in early 1998, creating the GWMA. The goal of this group is to find management solutions to reduce nitrate concentrations in the ground water. These three counties represent approximately 5825 square miles and share over 95 percent of the current Columbia Basin Irrigation Project.

With an estimated budget of approximately $3.7 million, the major projects include, plan development and administration, water monitoring and characterization, public information and education, and plan implementation and research. Close to a hundred local citizens serve on five Ground Water Advisory Committees (GWAC) and make recommendations to a fifteen member citizen GWMA Executive Board. The Executive Board evaluates the recommendations and presents them to the local conservation districts and the three boards of county commissioners.

Growers, producers, local public officials, local health officials, irrigation districts, conservation districts, and citizens are involved with the GWMA process, along with agricultural groups and state and federal agencies. Although the Columbia Basin GWMA has no specific legal authority or existing program relevant to the PMP process, the Columbia Basin GWMA may be able to advise WSDA of problems relating to the use of pesticides in the Columbia Basin.

Irrigation Districts

While primarily involved with water quantity issues, there is a close relationship between water quality and quantity. There are 97 irrigation districts in Washington State represented by the Washington State Water Resources Association supplying water for agricultural purposes. Irrigation Districts work closely with the U.S. Bureau of Reclamation, and with their efforts in irrigation water management play a role in overall water quality issues. Although the state's irrigation districts have no specific legal authority or existing programs relevant to the PMP process, the irrigation districts may be able to advise WSDA of problems relating to the use of pesticides in agricultural areas.

Watershed Planning Projects

There are several watershed planning projects being developed statewide that focus on non-point pollution, instream flow, water quality, and endangered or threatened species protection within specific watersheds. The plans are developed by local committees with technical and planning assistance from the state. These plans often address both surface and ground water. Currently no watershed strategies have specific legal authority or existing programs relevant to the PMP process. However, these watershed planning units may be able to advise WSDA of problems relating to the use of pesticides in agricultural areas in the future.

Agrichemical Industry

The agrichemical industry, especially pesticide registrants, are an important source for technical and financial assistance. WSDA will seek funding for PMP implementation from the agrichemical industry to fund monitoring, education, and other PMP activities. WSDA will work with registrants, producers and applicators to determine the source of contamination."

CHAPTER 4
RESOURCES

As part of the generic state pesticide management plan, Washington must demonstrate that it has sufficient technical and financial capability to successfully carry out the pesticide-specific plans. Washington will rely heavily on existing programs and established monitoring efforts.

Many state, federal and local agencies are involved in ground water protection activities. While many of these programs are not targeted specifically at pesticides, their activities contribute to the goals of the PMP. Examples of this are programs that identify and map vulnerable aquifers or education programs targeted at pesticide user groups, especially farmers. Coordination and cooperation among the participating agencies will be essential for the state's pesticide-specific management plans to succeed.

In Washington State, the expertise to carry out the plan components is spread among several agencies. The magnitude of the required efforts from agency staff will depend on the number of state management plans written and their complexity. Agency staff and funding requirements to meet the responsibility outlined in this chapter will shift as agency resources weather the changing funding climate. Those agencies suffering the effects of previous staff and program cuts will require additional resources if they are to meet their commitments outlined in the pesticide-specific plans.

The availability of resources will ultimately play a large role in the number of pesticide-specific plans the state will choose to write and the nature of the plans themselves. WSDA will seek funding for PMP implementation, including working with the agrichemical industry to fund monitoring, education, and other PMP activities. If resources are so limited that an EPA-approved pesticide-specific plan could not be developed, then the availability of the pesticide in Washington would be in jeopardy.

PROGRAM-SPECIFIC RESOURCES

This section illustrates WSDA resources for staff, monitoring, education and outreach, and enforcement efforts related to the pesticide-specific management plans.

STAFF RESOURCES

The table below describes current WSDA programs and expertise as they relate to state pesticide management plans. All three branches within the agency's Pesticide Management Division will be involved in state management planning and implementation. This includes the Pesticide Compliance Program, the Pesticide Registration Program and the Program Development Program. Activities included within these Programs are water quality protection, chemigation/fertigation technical assistance, waste pesticide disposal,

certification and training and endangered species programs. The following program descriptions and staffing levels are based on December 2000 figures.

Table 13: Pesticide Management Division Resources

Program	Duties	Current FTE's	Additional FTE's
Water Quality Protection Program	Develop the state's strategy for managing agricultural pesticides and nutrients for ground water protection. Develop generic and specific PMPs.	1.3 FTEs	.5 FTE
Chemigation and Fertigation Technical Assistance Program	Assist chemigation and fertigation operators to make sure backflow prevention devices are installed and used to protect ground and surface water.	2.0 FTEs	.5 FTE
Waste Pesticide Disposal Program	Collects and properly disposes of unusable pesticides that have accumulated on farms, ranches and similar areas through the years.	3.1 FTEs	N/A
Certification and Training Program	Licenses pesticide applicators and coordinates continuing education. Provides pesticide safety training in Spanish to Hispanic farmworkers and their families. Also publishes division's newsletter "Pesticide Notes".	11.6 FTEs	N/A
Endangered Species Program	Facilitates endangered species issues as they relate to the Agency's programs and to pesticides and fertilizers.	7 FTE	.5 FTE
Pesticide and Fertilizer Registration Program	Review labeling, approve or deny registrations for all pesticides, fertilizers and feeds distributed in state, issue section 18, 24c and experimental use permits. Also revise secondary containment rules to protect ground water.	19.0 FTEs	N/A
Pesticide Compliance Program	Enforces state and federal laws and rules relating to pesticides. Conducts numerous inspections in conjunction with a cooperative agreement with the EPA. Responds to complaints involving pesticide misuse and opens enforcement cases resulting from inspections.	20.0 FTEs	.5 FTE
TOTAL FTES REQUIRED			**2 FTEs**

Currently the WSDA Water Quality Protection Program is staffed with 1.5 employees. To administer the requirements of the pesticide-specific management plans, two additional full time employees would be required, one project employee for a period of three years, and one permanent employee for the length of the PMP program. The project employee would work with the water quality protection manager allowing the manager to continue managing all aspects of the Water Quality Protection Program while concurrently placing priority on the development and implementation of the pesticide-specific management plans. The permanent full time equivalent would work directly with commodity groups and stakeholders in developing and implementing the parameters of the pesticide specific plans. This position would also assimilate ground water monitoring data when available, analyze specific areas of concern using the aquifer vulnerability study model developed by Ecology and USGS, and participate in education and outreach efforts.

The other two half time equivalents illustrated in the table above could be combined to equal one full time, permanent employee in charge of coordinating the pesticide-specific plans with endangered species efforts, and with the chemigation and fertigation and compliance staff. As a field position, this employee would work with WSDA staff to ensure management strategies were realistic, tailored for and adopted by irrigated and dryland agriculture. This employee would also train compliance staff about restrictions found in the pesticide-specific plans, and assist with enforcement and response efforts.

Evaluating the responsibilities associated with developing, implementing, managing, and enforcing the PMP requirements effectively will require more effort and staff than currently exists. The cost for a three-year, project employee and one permanent, full time position both at the Agricultural Chemical Specialist 3 level, would be approximately $120,000 per year for three years, and $60,000 per year after that.

Figure 3: FTE Breakdown For PMP Implementation

Two Agricultural Chemical Specialist 3 Positions		
Annual Salary	$38,700	
Benefits	$11,223	
Total	**$49,923**	
Goods & Services	$10,077	(Computer, phone, office space, etc.)
Total	**$60,000 per year**	
	$120,000 per biennium	

MONITORING AND DATA RESOURCES

WSDA staff has limited monitoring and data resources available to adequately evaluate areas identified as vulnerable to one of the four-targeted pesticides. No statewide ambient ground water monitoring exists at this time. Therefore WSDA staff will use an aquifer vulnerability model to determine potentially sensitive areas in the state, and will utilize current and historical monitoring data when evaluating these areas of concern. In addition, information gained from studies conducted during the 1990s which continue to date, will be used. The aquifer vulnerability assessment and the historical studies are described below.

Due to the lack of funding for an ambient ground water monitoring program, and the fact that no other state agency (with the exception of the Department of Health through the Drinking Water Program and Department of Ecology through area wide studies) is collecting ambient ground water monitoring data, WSDA sees monitoring requirements as the biggest problem in adequately administering the PMP.

Table 14: Ambient Ground Water Monitoring Data Collected by Agency

AGENCY	MONITORING DATA COLLECTED
Washington State Department of Ecology	Maintains environmental information management database (EIM). Most data in EIM is from the Clean-Up Program and Source Water Protection Program. Expect more data in the future from other agency programs.
Washington State Department of Health	Conducts a statewide drinking water well monitoring program for all public water supply systems.
Local Government (Cities/Counties/Districts)	Conducts ground water assessments and data collection in support of Ground Water Management Area, Critical Aquifer Recharge Areas, etc.
Washington State Department of Natural Resources	Does not have or collect ground water monitoring data.
Washington State Department of Agriculture	Does not have or collect ground water monitoring data (at this time).

Until funding and staffing for a statewide ambient ground water monitoring program are made available, WSDA will continue to rely on drinking water monitoring data from other agencies and area wide assessment projects conducted by other government agencies. These include the DOH, the USGS National Water Quality Assessment (NAWQA) monitoring data studies and other related studies conducted by the State, local governments, and GWMA's, and data collected by the Washington Agricultural Statistics Service. In addition, WSDA will use a model to create aquifer vulnerability assessments. An approach and time line for developing an ambient monitoring program is provided in Chapter 6. WSDA is committed to working with other agencies to focus future monitoring in areas of high vulnerability.

Aquifer Vulnerability Assessment

During fiscal year 1999, WSDA staff worked with the aquifer vulnerability subcommittee of the state Interagency Ground Water Committee to identify vulnerable ground water statewide. The intention was to overlap aquifer vulnerability information with pesticide usage data to determine the areas of concern in Washington State for the pesticide-specific management plans. Ecology's aquifer vulnerability study required a comparison of real data with results generated from a model developed to measure threats to aquifers in agricultural areas. The study also needed some programming assistance.

USGS became interested in this project and determined that USGS staff could provide historical information on atrazine and possibly other pesticides, and solve Ecology's programming needs. USGS drafted a proposal to enhance the project. For fiscal year 2000, WSDA committed water quality staff and assistance from pesticide registration staff, while Ecology committed to contributing $10,000 the first year and a staff person. USGS committed one staff person.

The PRZM2 model developed by EPA was run for the Columbia Basin Irrigation Project area in Grant and Franklin Counties to test the feasibility of using this model to delineate

areas of high pesticide leaching risk in the State. PRZM2 evaluates the effects of irrigation, rainfall, soil, vadose zone characteristics, pesticide characteristics, crop characteristics, and depth on pesticide leaching. Combining the results of modeling with maps of where these conditions occur creates a powerful tool for identifying the areas where ground water is most at risk from pesticide use. How the aquifer vulnerability study will be used for assessment and planning is discussed in chapter 5, *Basis for Assessment and Planning.*

Initially, the best information to use when evaluating historical usage comes from several studies conducted in the 1990s. WSDA has participated in a variety of studies and reports involving pesticide usage. The result of this work provides WSDA staff with additional information when making management decisions on pesticide usage in a given area. These studies are described below.

WSDA anticipates that a State-wide vulnerability assessment will be completed in 2004. USGS, Ecology, and WSDA have agreed upon a cost sharing arrangement to complete the assessment tool by February 2003. WSDA will then use existing staff resources to complete a State-wide assessment in 2004.

Ciba Study

In 1993 to 1994, WSDA participated in a national study sponsored by Ciba-Geigy Corporation to study atrazine and its degradates in ground water. This study was part of the re-registration process for atrazine. Washington's part of the study revolved around the use of atrazine on Christmas tree plantations. WSDA screened drinking water wells associated with Christmas tree plantations for the presence of atrazine. Wells that tested positive were re-sampled and the water sent to Ciba's labs. Split samples were analyzed by WSDA's pesticide laboratory in Yakima, Washington. The Ciba study gave Department of Agriculture personnel experience in sampling well water in the field, evaluating well construction records and using immunoassay technology to analyze samples.

A small number of the 109 private wells located in eight counties of Western Washington tested positive for atrazine using immunoassays. Atrazine was detected between 0.11 and 0.21 ppb during the study conducted between 1993 and 1994. These results indicate no impairment of water based on the generally low concentrations of atrazine (compared to EPA's Maximum Contaminant Level for drinking water of 3 ppb and Washington State's ground water quality criteria also at 3 ppb) found in a small number of wells.

Christmas Tree Study

WSDA also conducted a separate study of pesticide use on Christmas tree plantations and their impact on water quality in 1994. Approximately 23,000 acres of Christmas trees are grown in the state. Pesticides are thought to be used on about 75 percent of the acres under cultivation. A Water Quality Financial Assistance grant administered by Ecology funded this study which concentrated on surface water contamination. Some ground water testing was done as well. WSDA's pesticide laboratory in Yakima has obtained environmental laboratory accreditation from Ecology's Quality Assurance Section, and tested samples for

atrazine, hexazinone, endosulfan and chlorothalonil in streams and ground water during 1994.

Herbicides, including glyphosate, atrazine and hexazinone, were the main category of pesticide used for Christmas tree production on about 75 percent of the surveyed acreage. Based on EPA's current Maximum Contaminant Level (MCL) criteria of 3 ppb, the low level detections of atrazine (ranging from 0.04 to 0.13 ppb) found in older (i.e. three were bored in the 1940's) and shallower wells (about 43 feet) in this study did not pose a major risk to well owners or significantly impact ground water in western Washington.

1998 PMP Pesticide Usage Study

In 1998, WSDA's Water Quality Protection Program hired a consultant to gather usage data for atrazine, simazine, metolachlor, and alachlor. The information collected included the volume of pesticide applied in pounds of active ingredient, and usage patterns including information on target site, formulation, rate and method of application. This information gave WSDA staff an initial idea of how much of each of these pesticides is used in Washington State and which commodity groups to work with when developing the pesticide-specific management plans.

EDUCATION AND OUTREACH RESOURCES

WSDA's ground water education and outreach efforts are currently carried out through the annual recertification courses and articles published in the WSDA Pesticide Management Division's newsletter, "Pesticide Notes". Further education and outreach efforts related to the PMP process are outlined in Chapter 8, *Public Awareness and Participation*.

ENFORCEMENT RESOURCES

As described in Chapter 7, WSDA will implement the PMP enforcement provisions to prevent and respond to contamination with existing staff using state funding, and matching funds from its cooperative agreement with the EPA. In addition to personnel and operating funds, WSDA will also use existing state funding for analytical costs for pesticide investigations related to ground water. Existing federal and state enforcement authority will be used.

EXTERNAL RESOURCES

External resources include other state and federal agencies, local government, commodity groups, and professional organizations.

STATE AGENCIES

WSDA staff will work closely with other state agencies including the state Departments of Ecology, Health, the Washington State University Cooperative Extension, and the Washington State Conservation Commission. Specific contributions from these agencies are described below.

Washington State Department of Ecology (Ecology)

Many programs within the Department of Ecology conduct ground water activities. The activities listed below all relate either directly or indirectly to ground water management in the state. Many ground and surface water quality activities conducted by the agency are managed with a watershed and/or geographic approach. For the purposes of the PMP, all activities conducted independently by separate programs will be linked, in order to achieve increased coordination and consistency.

Table 15: Ecology's PMP Related Activities

PROGRAM	PMP-RELATED ACTIVITIES
Water Quality Program	Implements the Ground Water Quality Standards, and Washington's Comprehensive State Ground Water Protection Program. Also administers grant monies for water quality projects within the state.
Solid Waste and Financial Assistance Program	Provides technical assistance to local government for design and installation of ground water monitoring systems at solid waste management sites.
Hazardous Waste and Toxics Reduction Program	Ground water is monitored in and around all treatment, storage, or disposal facilities as well as selected generation facilities. Ground water clean up is conducted through the corrective action clauses of RCRA.
Water Resources Program	In charge of surface and ground water rights management for State. Manages Ground Water Management Area program and characterizes ground water basins to evaluate potential for ground water allocation and withdrawal.
Environmental Investigation and Lab Services Program	Has conducted numerous studies on pesticides in ground water throughout the State.
Toxic Clean-Up Program	Administers the State's Model Toxics Control Act (Washington's superfund). More than half the clean-up activities are ground water related.

Washington State Department of Health (DOH)

Several Department of Health activities and programs are relevant to the Pesticide Management Plan. The wellhead protection program and the newly evolved source water protection program are critical in assessing potential sources of / and preventing contamination of ground water used for drinking water. As such, these programs are an important piece of an overall ground water protection strategy. Drinking water monitoring data will be a key component of the PMP monitoring plan. Fact sheets generated by the Office of Toxic Substances explaining the meaning of analytical results sent to well owners may be used as part of PMP outreach efforts.

Washington State University Cooperative Extension (WSU)

Cooperative Extension educators play an important role in general pesticide education in the state. They work closely with WSDA's pesticide licensing and recertification staff. Extension organizes many meetings involving farmers and other pesticide user groups

every year for pre-license training and recertification. These training sessions will provide an avenue to educate pesticide applicators about the PMP. Any ground water research related activities will be used and included in the pesticide-specific plans.

Washington State Conservation Commission (WCC)

The Washington State Conservation Commission gives administration and program assistance to 48 conservation districts throughout the state. Under the WSCC guidance, conservation districts work with local governments and landowners to promote conservation. Many conservation districts have become involved in water quality issues during the last few years. The districts help farmers write and implement farm plans that take a holistic approach to environmental issues at the individual farm level. The districts can play a major role in education and translating education into on-farm activities related to ground water protection.

FEDERAL AGENCIES

There are several federal agencies that will be of assistance in developing and implementing state management plans. The EPA provides guidance and technical assistance in development of state management plans as well as funding for the effort and other related water quality programs within the state. The NRCS is involved in providing on-farm technical assistance and farm planning for resource management and water quality protection. The USGS conducts water quality investigations and can provide data for assessments in certain areas of the state. They are a resource for data and technical assistance in vulnerability assessment and GIS technology. In addition, the National Agricultural Statistics Service compiles statistics on agricultural production nationally which will help assess pesticide usage in Washington State.

LOCAL GOVERNMENTS

Local governments can provide information on local conditions and activities. The Growth Management Act and other planning efforts have generated information and data on drinking water supply vulnerability. The availability of information varies from county to county. The state agencies (Department of Ecology and Department of Agriculture) will work with local governments, via the Critical Aquifer Recharge Area guidance document updates, taking advantage of their knowledge of local conditions and people.

COMMODITY GROUPS

Commodity groups such as the Washington Association of Wheat Growers and the Washington State Raspberry Commission have a role in both planning and implementation. These groups represent the various types of agricultural commodities grown in the state. Their involvement in the planning process is necessary to assess the effect of the different strategies that may be taken to prevent ground water contamination. They are also important in evaluating the impacts of losing a particular pesticide if a management plan is not written. The various commodity groups generally have annual meetings and newsletters to get information to their members. Additionally, in the past specific commodity groups

have participated in defining data collection activities in support of their interests. As of April 2003, the status on the commodity groups is in question based on recent court ruling regarding the funding mechanisms to support these groups.

OTHER PROFESSIONAL ORGANIZATIONS

In Washington State, there are many groups representing various parts of the agricultural industry. These groups represent aerial applicators, pesticide and fertilizer dealers and the field men who make recommendations to farmers on pesticide use. There is a lot of expertise on current practices within these groups as well as communication with farmers. WSDA staff will work with many of these groups to successfully develop and implement pesticide-specific management plans.

CHAPTER 5
BASIS FOR ASSESSMENT AND PLANNING

The primary objective of Washington's generic and pesticide-specific management plans is to minimize pesticide migration beyond the zone or area of intended use while maintaining to the greatest extent possible, the ability to use pesticides deemed critical to the agricultural community in the state. This chapter describes the state's tools for evaluating the potential for pesticide impacts to ground water.

This chapter contains a description of the ground water assessment and planning processes to be used as part of the PMP program. Site-specific characteristics will be researched and further evaluated when the demand is present. Vulnerability information, monitoring data, pesticide use data and information on the use of ground water will be used to determine geographic areas most in need of management efforts for each pesticide. In addition to statewide prevention efforts, appropriate protection and response strategies will be developed for local or regional areas according to the template established in the Generic Plan. Special studies will be used to fill in data gaps as studies are completed and QA/QC'd.

NATURAL RESOURCE CHARACTERIZATION

Washington State has a great deal of diversity with regards to climate, geology, soils, aquifers, and land use practices. This section provides a general overview of the factors contributing to the movement of pesticides through soil and ground water.

- *Climate* – Washington State has a diverse climate. Western Washington receives considerable rainfall and generally has moderate temperatures. Eastern Washington receives less rainfall and experiences more extreme temperatures. Weather data collected by the NOAA weather stations provide daily meteorological data, including precipitation and temperature. This information is used to calculate average annual rainfall and can be used in models to calculate the amount of water available for recharge.

- *Geology* - Geology provides the physical framework controlling ground water occurrence and movement. Soils, plant cover and land use control the amount of water reaching below the land surface to become available for ground water recharge. Climate and topography control the amount and location of precipitation occurring and the amount evaporated.

  Geological features of Washington include the coastal mountain range that divides the state in two, creating an area with high precipitation to the west and a more arid area to the east. Other significant geological features include the Puget Sound Lowlands in Western Washington and the Columbia Basin Plateau located in the middle of the state.

- *Soils* - Soil properties influence the fate and transport of contaminants. The soils of Washington State are diverse and to differing extents influenced by volcanic activity. They can be described based upon their location relative to the Cascade Mountains. West of the Cascades, higher rainfall and warm maritime temperatures result in soils that are higher in organic matter and fertility. They contain varying amounts of volcanic ash from local sources and are subject to water erosion if left unprotected. Eastern Washington soils are less developed because of the lower rainfall. Soils may contain higher amounts of soluble salts and lower amounts of organic matter.

- *Land Use Practices* - Land use can effect the hydrology of an area significantly. In urban areas, paving can cause water that might have recharged the ground water to run off. In agricultural areas, irrigation can cause an immense amount of ground water recharge that otherwise would not have occurred. In Washington, the largest urban areas are located west of the Cascade Mountains and around the Puget Sound area. The northern and southern portions of Western Washington contain substantial amounts of agriculture. Eastern Washington is primarily agricultural. The larger urban areas are Spokane, the Tri-Cities of Kennewick/Pasco/Richland and Yakima.

DRINKING WATER SOURCES

Although Washington State classifies all its ground water as a potential source of drinking water, areas that are current sources of drinking water receive greater attention under current programs. Areas covered by the wellhead protection program and source water protection program are the focus of more intense regulatory or non-regulatory management of contamination sources. Critical Aquifer Recharge Areas and Sole Source Aquifers are other areas where more attention is given to contamination sources. Even though all ground water is considered drinking water, these types of designated areas will continue to be provided with greater monitoring, protection, and enforcement effort.

TRACKING PESTICIDE USE IN WASHINGTON STATE

Pesticides are used extensively in a variety of land use settings including irrigated, non-irrigated, grazing, and pasture lands, as well as in industrial, urban and residential settings. Pesticides continue to be important crop protection tools in Washington State. However, contamination of ground water in some areas of the state has occurred.

WSDA recognizes pesticide usage data is important to the PMP development process and will use existing data sources. Existing data sources include pesticide use data collected by the Washington State Agricultural Statistics Service, USGS pesticide data published on Washington State, and the Pesticide Use Study conducted by WSDA in 1998 described in chapter 4, *Resources*. This study provided WSDA with information on usage patterns, formulation, rates and methods of application, and volume in pounds of active ingredient applied for atrazine, simazine, alachlor, and metolachlor. The study also listed crops using the four-targeted pesticides.

In addition, WSDA will use the limited, existing ground water monitoring data from the state Departments of Health and Ecology. WSDA will use all these data sources recognizing their limitations, and will work to develop new ground water data sources.

WSDA can require pesticide application data reporting if it is determined there is a potentially significant impact to the ground water resource. Pesticide application record call-ins and GIS mapping are useful tools for assessing pesticide use and aquifer vulnerability. However, they are very expensive to acquire, screen and enter into a database. WSDA has a limited capability to use application record call-ins for state pesticide management planning and will reserve this tool for areas of significant concern. Existing ground water quality data and known health affects information will be used to determine pesticides needing additional reporting requirements.

The extent of WSDA's PMP program will be determined by the severity of the pesticide problem. If it is determined one or more of the targeted pesticides poses a significant threat to Washington's ground water (as determined through use of Chapter 173-200 WAC), WSDA may chose to require dealers and applicators to provide specific pesticide sales and application information. This information could include location, target site, acres treated, irrigation practices, and rainfall events after application.

WSDA also plans to use information gained from an Aquifer Vulnerability Study initiated in September 1999, modeling potentially vulnerable ground water in the Columbia Basin. Other assessment tools such as future ground water monitoring by the USGS in the Yakima Basin and in the Central Columbia Plateau will also be used for evaluation and PMP planning.

ASSESSMENT AND PLANNING TOOLS

Washington State agencies have made several attempts to assess pesticide impacts on aquifer vulnerability in our state. The historical efforts are listed below. The lessons learned from these previous efforts serve as building blocks for the current efforts underway.

HISTORICAL EFFORTS

In 1989, EPA Region 10 Office of Water initiated the Ground Water Vulnerability Project. The project involved working with individual states to design, fund and implement ground water vulnerability projects. The Task Force initiated pilot demonstration projects in 1990 in two study areas of the state. The study areas were located in portions of Franklin and Thurston counties. An area-based mapping approach was used in the pilot study areas. Regional vulnerability was assessed based on separate GIS models for hydrogeologic susceptibility and contamination loading. The two were combined, producing a GIS-ready ground water vulnerability score. The project used a modified version of the DRASTIC (Depth to water, Recharge rate, Aquifer characteristics, Soils, Topography, Impact of vadose zone and hydraulic Conductivity) model for assessing leaching susceptibility. However, the model failed to produce usable results.

Also in 1989, EPA Region 10 initiated the Pesticide Application Record Database Project. This project was intended to facilitate the use of this data by local, state and federal agencies involved in resource management. The primary design required the database to perform spatial analysis of pesticide application data, and be compatible with other GIS data. If successful, the project would enhance the management of pesticides and ground water resources.

The project was conducted in two phases. Phase I involved development of the Pesticide Application Data Management System (PADMS). The database was completed in 1990 by USGS through an interagency agreement with the EPA. PADMS utilizes ARC/INFO® GIS software to store and retrieve geographically referenced pesticide application data within Washington State. Phase II of the project was designed to demonstrate the PADMS in operation, map production and demonstrate its usefulness as a resource management tool. Phase II involved collection and analysis of pesticide application data from two pilot project areas; Franklin and Thurston County Pesticide Study areas. Phase II was started in August 1990 and completed in September 1992.

WSDA conducted a voluntary pesticide application record call-in in the two study areas in Thurston and Franklin counties. The Department received a total of 1,237 application records. 1,163 records were entered into the database; 74 of the records received were not acceptable for data entry. Because the record request was voluntary, pesticide applications were under reported for the study areas. The Department also had difficulty identifying and contacting unlicensed pesticide applicators.

WSDA entered the data into its Pesticide Management Database, also called the Pesticide Application Tracking database by WSDA. The data were then transferred (uploaded) to the PADMS for spatial analysis and mapping. The project carried out a series of mapping exercises to demonstrate the feasibility of the system for resource management. It was generally concluded collection and storage of pesticide application data is feasible and GIS analysis of pesticide application and related data has a wide variety of applications for resource management. The ground water vulnerability part of the project used Agricultural DRASTIC for the susceptibility element.

CURRENT EFFORTS

While the efforts above did not provide the kind of information needed to make aquifer vulnerability assessments in agricultural areas, they did provide insight as to the type of study that might work. Since the early 1990s, Ecology has worked on an aquifer vulnerability study to produce usable results that could be used as a management tool. The study's progress was slow because of staffing and programming problems.

In 1999, WSDA, USGS and Ecology developed a project proposal for an aquifer vulnerability study in the Columbia Basin (to be expanded statewide) specifically for the PMP development process. This project was initiated in September 1999, and was funded by EPA with matching funds from Ecology, WSDA and USGS.

Joint Aquifer Vulnerability Study

When completed, the Joint Aquifer Vulnerability Study will identify agricultural areas needing to be considered for pesticide management planning. The study uses available pesticide data and the results of statistical analysis methods to help validate the use of a process-based model for predicting the vulnerability of ground water to pesticides. Delineating zones of ground water vulnerability to pesticides requires an evaluation of many factors such as depth to ground water, soil type, recharge, pesticide usage, and pesticide transport properties. Methods to evaluate vulnerability fall into three general categories: 1) overlay and index methods, 2) statistical methods, and 3) process-based methods. For more details see the Washington Department of Ecology March 2002 Publication No. 01-10-027 "Aquifer Vulnerability Analysis Using the Pesticide Root-Zone Model (PRZM2) - Columbia Basin Irrigation Project Area.

For the purpose of this study, a process-based method was chosen to compare the PRZM2 model results with observed data from the USGS National Water Quality Assessment (NAWQA) studies. USGS tested a logistic regression study on the atrazine data from the Columbia Basin Irrigation Project (CBIP) area. Atrazine was selected because historical data is available, it is one of the four pesticides that may require a pesticide-specific management plan, and it is considered the most problematic of the four pesticides targeted by EPA. There was not enough specific data to successfully complete the logistic regression study. If the data became available, the study would enable a comparison of susceptibility maps between the statistical method and the model method on a regional basis.

In fall of 2000, during the development of the Joint Aquifer Vulnerability Study, USGS staff expressed some concerns about using the PRZM model to predict concentrations of pesticides in ground water on a regional scale. This mainly stems from the complexity of the model and its ability to estimate numerous input parameters without collecting field data to verify them. This implies that without field calibration, the model may work as a tool to rank areas as to relative vulnerabilities, but not as a tool to accurately predict concentrations. As a result, project objectives were revisited and updated to the following:

Objective 1: WSDA will use information generated by USGS and Ecology to designate agricultural areas in the state requiring pesticide-specific management plans.

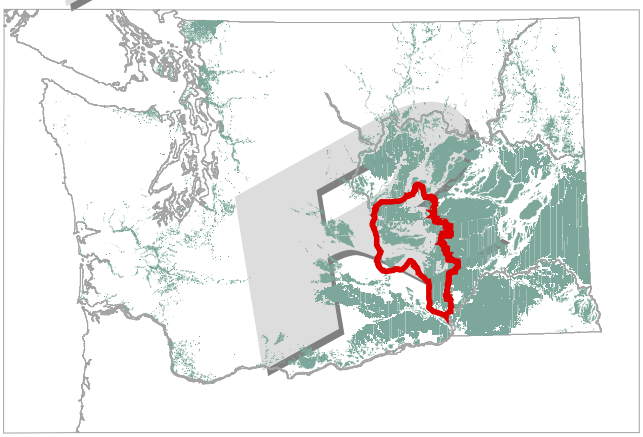
Objective 2: Ecology and USGS will develop a process-based modeling approach to help delineate areas of high, medium, and low vulnerability of ground water to pesticides in the management areas.

Objective 3: The method used to evaluate the feasibility of using a process-based model for determining vulnerability of ground water to pesticides will be to compare Ecology's modeling results to modeling at individual NAWQA wells where pesticide data are available.

Aquifer Vulnerability Study Area: Columbia Basin Irrigation Project (CBIP)

A major portion of the initial phase of the Aquifer Vulnerability Study was the information gathered pertaining to the Columbia Basin Irrigation Project.

Figure 6: Location of Columbia Basin Irrigation Project



The Columbia Basin Project is a multipurpose development utilizing a portion of the resources of the Columbia River in the central part of Washington. Construction of the CBIP has brought some 671,000 acres under irrigation.

The soil and climatic conditions are favorable to the growth of grain, alfalfa hay, ensilage crops, dry beans, fruit, sugar beets, potatoes, sweet corn, seed and other specialty crops. Dairy farming and beef production are significant in the area.

Components Used to Evaluate Aquifer Vulnerability

The Aquifer Vulnerability Study uses a number of components to evaluate vulnerability. The major components are: soil properties, precipitation including rainfall and irrigation, depth to water table, surficial geology, hydrogeology, cropping, and pesticide data. The collected data is analyzed using the model PRZM2, displayed using Arc View GIS and viewed as a map.

How PRZM2 Works

The Pesticide Root Zone Model (PRZM) is a one-dimensional, dynamic, and compartmental model that can be used to simulate chemical movement in unsaturated soil within and immediately below the plant root zone. It has two major components - hydrology and chemical transport. The hydrologic component for calculating runoff and erosion is based on the NRCS curve number technique and the Universal Soil Loss Equation. Evapotranspiration is estimated either directly from pan evaporation data, or based on an empirical formula. Evapotranspiration is divided among evaporation from crop interception, evaporation from soil, and transpiration by the crop. Water movement is simulated by the use of generalized soil parameters including field capacity, wilting point, and saturation water content. The chemical transport component can simulate pesticide application on the soil or on the plant foliage.

The results of the PRZM analysis are transferred to Arc View GIS to produce a vulnerability map. This model will also be used to identify potentially vulnerable scenarios in areas of the state

Vulnerability Model Limitations

Ecology's "Aquifer Vulnerability Analysis Using the Pesticide Root-Zone Model (PRZM2) - Columbia Basin Irrigation Project Area" (pages 45-47) discusses the models current limitations. For example, the assessment results currently only apply to atrazine but the model can be modified for other pesticides. The model is currently viewed as providing a comparison between areas rather than being a predictive tool. However, once USGS completes their evaluation of the assessment for the Columbia Basin project, the value as a predictive tool may be better established. As discussed in Chapter 7, control strategies will be based on patterns of detections in a geographic area or vulnerability assessments. If initial regulatory response actions are to be based solely on the vulnerability assessment, then the assessment should be a fairly accurate predictor of contamination.

Future Work and Project Timelines

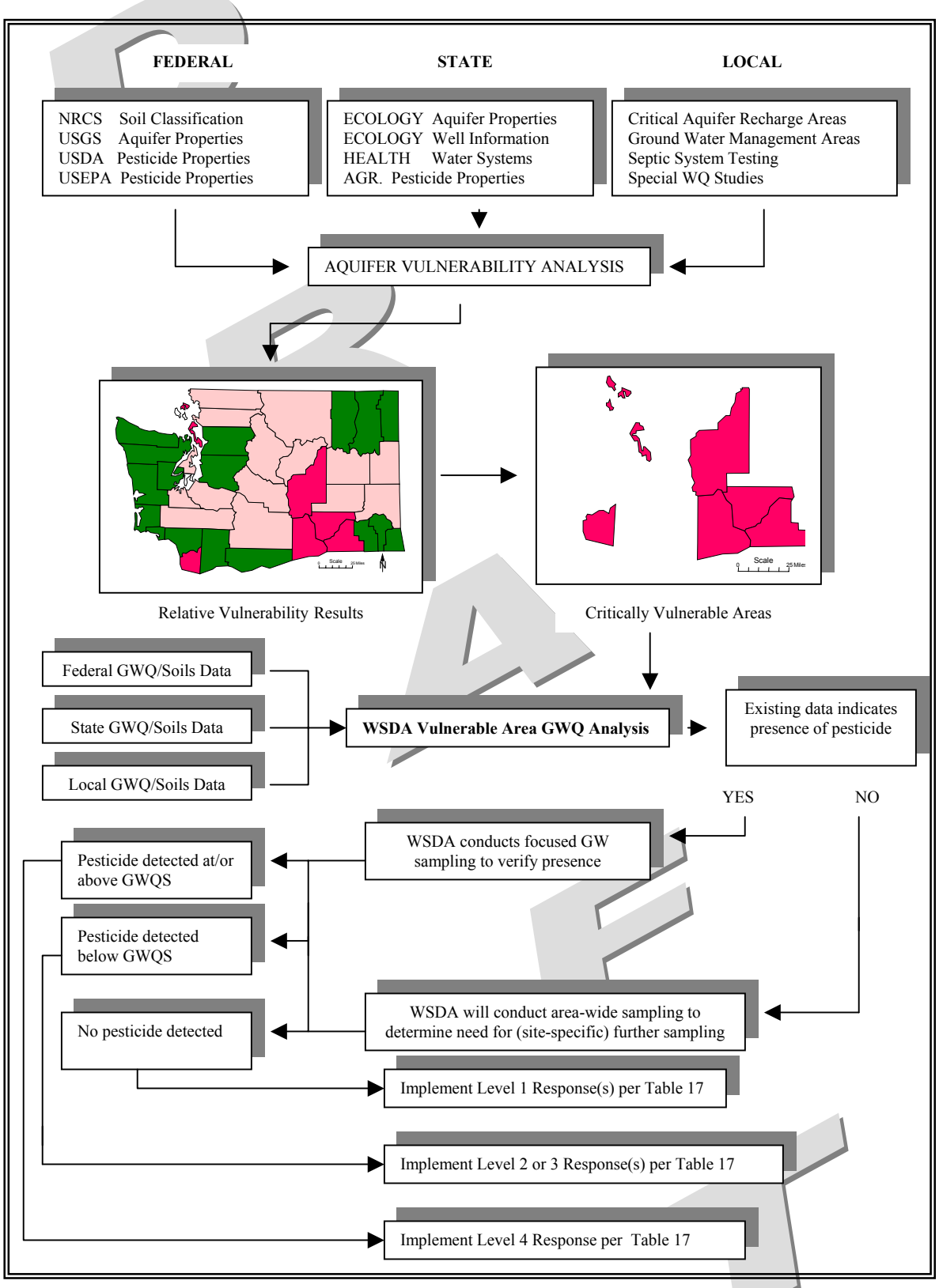
Ecology and USGS are close to finishing the evaluation of using the PRZM model for determining the vulnerability of ground water to pesticides. Ecology and USGS plan to make final revisions by February 2003. The USGS report will focus on the evaluation of the PRZM model, and Ecology's will focus on modeling results and how they will be used in the PMP process. WSDA anticipates that the assessment will be a valuable predictive tool.

WSDA anticipates that it will complete a State-wide vulnerability assessment in 2004. The initial assessment will be based on atrazine chemistry. As management plans are developed for particular pesticides, WSDA will modify the assessment to reflect the chemistry, mobility, and usage patterns of each compound.

Additional Assessment Tools

Local jurisdictions will also provide valuable information for pesticide-specific management plans as ground water vulnerability projects have been conducted in a number of Washington counties. Most of this activity is driven by requirements of the Growth Management Act. The Act requires counties and cities planning under the Act to classify and designate Critical Aquifer Recharge Areas (CARAs). Ecology guidelines recommend classifying CARAs according to aquifer vulnerability. Clark County, Lincoln County and Thurston County all have active aquifer vulnerability assessment programs. It is anticipated much useful information can be gained at the local level, and this information will be used for pesticide-specific management plan development. Ground water monitoring data from local, state or federal sources indicating a potential for concern will also be used to assess aquifer vulnerability and the need for specific pesticide management.

Figure 7: Decision Making Process - Ground Water and Pesticide Impacts



Based on the results of the vulnerability determinations and ground water quality assessments, WSDA will make a management decision regarding the need for additional information (ground water quality data) either on a site specific or area wide basis. If it is determined that additional information is warranted, WSDA will conduct additional environmental monitoring (soil and/or ground water) to determine the current levels and potential future levels that a specific pesticide may exists in the environment. It order to accomplish this task at the highest level possible, WSDA may elect to form partnerships with stakeholder groups and/or other state and federal agencies interested in obtaining technically valid information on pesticide levels in soil and ground water. Conducting soil and/or ground water monitoring beyond currently existing information is considered a vital component of the Pesticide Management Plan. Newly acquired information will allow WSDA to monitor the progress of voluntary or mandatory measures on ground water quality. Figure 7 illustrates the decision making process.

WSDA will use the statewide vulnerability assessments to target appropriate prevention strategies for local or regional areas. WSDA will need to place greater emphasis on prevention efforts until ground water quality data is available. The vulnerability assessment will allow WSDA to place additional prevention effort in areas that are most vulnerable to contamination.

CHAPTER 6
MONITORING AND MANAGEMENT MEASURES

Monitoring and prevention will be integral components of all pesticide-specific management plans. The objective of monitoring will be to assess ground water quality and evaluate effectiveness of management plan strategies in preventing and mitigating any existing and future ground water contamination. To date, monitoring data is limited to public water supply systems, private studies, and local, state and federal studies conducted in different regions of the state. However, there is a renewed focus on ground water monitoring in Washington State and current efforts are underway to implement a regional, pilot ground water monitoring program. If successful, this program would eventually be used statewide and would make a substantial difference for PMP monitoring and prevention efforts. Until this happens, WSDA staff will need to place their emphasis on the prevention efforts described in this chapter.

GROUND WATER MONITORING

Because WSDA will be selecting the voluntary and/or regulatory measures to prevent and respond to contamination, the Department will need to collect or be provided a variety of monitoring information and supporting information. WSDA will need to work with other State and local agencies to ensure all pesticide detections from ground water sampling are reported in a timely manner to WSDA. However, because existing data collection is limited, an ambient monitoring program is needed - especially in areas of moderate to high vulnerability - to identify contamination problems. If contamination is found, WSDA will need to evaluate the existing monitoring data, may need to have the wells retested, or may need to have additional monitoring conducted to define the severity and extent of the problem and to identify the source of the contamination. Once WSDA selects and implements management actions, the Department will need data to decide if those actions are effective. Throughout all these efforts, WSDA is committed to making management decisions based on sound information of known quality.

To accomplish these monitoring tasks, WSDA will need to coordinate with and draw upon resources of many federal, State, and local agencies, commodity groups, and the pesticide industry. WSDA will coordinate monitoring projects with Ecology ,the Interagency Ground Water Committee and Washington State University. WSDA will consult these agencies on an as needed basis for expertise in data interpretation, hydrogeology, aquifer characterization, vulnerability, and mapping. The Department of Health will provide expertise on risk assessment, hydrogeology, ground water vulnerability and investigations of contamination of public drinking water systems. Washington State University will provide expertise in remediation research and in pesticide movement and breakdown in soils and water. USGS will be consulted on an as needed basis for expertise in pesticide and ground water monitoring, vulnerability, and data evaluation associated with pesticide contamination problems. Commodity groups and the pesticide industry may be asked to support pesticide user surveys and monitoring.

To date, Washington State does not have an ongoing ambient ground water monitoring program. This is a concern to WSDA and to the members of the Interagency Ground Water Committee. To address this problem, the committee formed an ambient ground water monitoring subcommittee with representatives from the state departments of Agriculture, Health, Ecology and from EPA.

HISTORICAL MONITORING EFFORTS

Ecology conducted an agricultural chemicals pilot study in 1988 consisting of sampling ground water from wells located in Whatcom, Franklin and Yakima Counties. The primary objective of the study was to provide information on the presence and concentration of pesticide residues in ground water from normal pesticide use. Twenty-seven shallow wells were selected as "worst case" examples in each study area. The wells were tested for 46 pesticides known or suspected of leaching into ground water. Twenty-three of the 81 wells tested positive for at least one of the pesticides. Data from the pilot study and additional sampling are kept in Ecology's database.

The goal of the study was to characterize pesticide residues geographically and over time in ground and surface water throughout Washington. The Pilot Study tested ground water for 46 pesticides. The number increased to a total of 145 pesticides as new pesticides were added to existing test methods. The number of pesticides analyzed varied from site to site. Most sites were private domestic or irrigation wells, while some were monitoring wells and two sites were field drains. The average depth of the wells was 50 feet with a range of five to 200 feet.

The results of the study showed 21 pesticides were detected in the tested wells. The study sampled 243 wells. At least one pesticide was detected in 102 wells of this sampled population. In numerous sampled wells more than one pesticide was detected. In all 168 separate pesticide detections were made.

The average depth of wells with pesticide detections was 38 feet with a range of 5 feet to 110 feet.[4] As illustrated in Table 16, Pesticides Detected in Washington's Ground Water, the five most common detections were dacthal, 1,2 dichloropropane, EDB, atrazine and simazine.

Although the historical data is helpful, it is only a starting point. Washington State needs an ongoing ground water monitoring program to determine if pesticides are reaching ground water at levels of concern. The Washington State Interagency Ground Water Committee has been working on this issue for some time and recently elevated its priority when it was realized no agency besides the State Department of Health is collecting ground water data.

[4] Screened intervals for the wells was not known at that the time of sampling.

Table 16: Pesticides Detected in Washington's Ground Water Between 1988 and 1990

Pesticide	Number of Sites Tested	Number of Detections	Percent Detections (%)	Maximum Concentration (ug/L)	Detection Limit (ug/L)	MCL or LHAL (ug/L)
dacthal (DCPA)	242	39	16	9.9	0.01	3500
1,2-dichloropropane	243	31	13	24	0.10	5
EDB (ethylene dibromide)	216	23	11	43	0.01	0.02
atrazine	243	17	7	0.42	0.01	3
simazine	243	8	3	0.08	0.04	4
pentachlorophenol	242	8	3	0.07	0.02	1
bromacil	243	6	2	14.9	0.50	90
xylenes	133	6	5	0.90	0.20	10,000
prometon (Pramitol 5p))	243	4	1.6	6	0.30	100
trans-1-3-dichloropropene	162	3	2	0.11	0.10	nl
4-nitrophenol	242	3	1	1.5	0.13	60
diuron	211	2	0.9	0.36	0.12	10
picloram	242	2	0.8	0.07	0.04	500
tebuthiuron	243	2	0.8	1.9	0.08	500
methiocarb	65	1	1.5	1.05	0.50	nl
dichlobenil	106	1	0.9	*0.01	0.10	nl
1,2-dibromo-3-3chloropropane (DBCP)	216	1	0.5	0.36	0.01	0.2
dicamba	242	1	0.5	*0.025	0.038	200
3,5-dichlorobenzoic	242	1	0.5	*0.035	0.037	nl
carbofuran	226	1	0.5	2.4	0.5	40
oxamyl (Vydate)	225	1	0.5	3.8	0.5	200

nl = not listed
MCL = Maximum Contaminant Level
LHAL = Lifetime Health Advisory Level
*Values less than detection limit are laboratory estimates

DIRECT AND INDIRECT MONITORING METHODS

Once it has been determined that there is a need for a pesticide specific management plan, and that plan has been developed and put into place, a monitoring strategy must be implemented. That strategy can take the form of direct monitoring whereby traditional ground water monitoring is conducted to determine whether the PMP is effective in preventing leachable pesticides from reaching the ground water resource or indirect monitoring where methods other than ground water sampling is employed. Both direct and "indirect"[5] methods have merit; however, direct ground water monitoring requires than the chemical(s) of concern have reached the very resource that is supposed to be protected.

Washington State's Ground Water Quality Standards exempt activities that apply chemicals or nutrients at agronomic rates for agricultural purposes if those contaminants will not cause pollution of any ground waters below the root zone (Chapter 173-200-010(3)(a), WAC). The goal of any pesticide specific management plan should be that specified above. Therefore, any sustained monitoring strategy must give considerable weight to monitoring methodologies that are capable of detecting the presence of leachable pesticides prior to that pesticide reaching ground water. However, in cases where ground water has previously been contaminated, it will be necessary to have a reasonable ground water monitoring program in place.

The use of indirect methods has merit from a technical, environmental and fiscal standpoint. In general the use of such methodologies as vadose zone monitoring is less expensive than the construction and sampling of a dedicated ground water monitoring well. It also provides for a determination as to whether contamination of ground water will occur before actual damage to the resource takes place, in time for modifications to be made in management of the specific pesticide. Finally, it may afford better site-specific data than a ground water monitoring system.

APPROACH TO AMBIENT MONITORING

Until funding and staffing for a statewide ambient ground water monitoring program are made available, WSDA will continue to rely on drinking water monitoring data from other agencies and area wide assessment projects conducted by other government agencies. These include the DOH, the USGS National Water Quality Assessment (NAWQA) monitoring data studies related studies conducted by the State, local governments, and GWMA's, and data collected by the Washington Agricultural Statistics Service. In addition, WSDA will use a model to create aquifer vulnerability assessments. WSDA is committed to working with other agencies to focus future monitoring in areas of high vulnerability.

[5] The use of the term indirect methods is used to include those sampling methodologies that may be used to detect pesticide residues in media other than ground water prior to ground water becoming affected. It is also used to describe the monitoring of other factors critical to pesticide leaching aside from the pesticide itself.

There are currently five potential sources for pesticide detections as the result of ground water sampling in Washington. WSDA will rely on these sources for information on pesticide detections in ground water:

- *The Washington State Department of Health* – may detect pesticide residue in public drinking water as part of its ongoing drinking water monitoring program. The Department of Health may conduct an investigation in response to a detection. These investigations are prioritized based on risk and available resources.

- *Local Heath Districts* – may test private wells for pesticides when the need is identified and the funding is available.

- *The Washington State Department of Ecology* – may conduct ground water monitoring for pesticides as part of a regional study or when funding is available.

- *Local Government* – As a result of required monitoring for GWMA's and Critical Aquifer Recharge Area's, cities and counties within the State are required to collect some ground water data pertaining to agricultural chemical use.

- *The US Geological Survey* – much of the pesticide detection data in ground water in Washington State comes from past and current USGS regional studies as part of the NAWQA.

Detections of pesticides may occur in domestic, stock water, irrigation, and public drinking water systems in the state. Under the Washington State Pesticide laws and rules, all ground water must be protected from pesticide contamination. WSDA will work with other state and local agencies to ensure all pesticide detections from ground water sampling are reported in a timely manner to WSDA for an evaluation and response determination. The source of the samples may be local, state, or federal programs.

RESPONSE MONITORING

When a pesticide is detected in ground water, WSDA will implement "response monitoring" to define the severity and extent of the contamination. The initial response monitoring strategy will focus on confirming the detection in ground water and determining the concentration level. As part of a strategy, WSDA will evaluate existing monitoring data or retest within area to check for previous detections and trends including monitoring additional wells in the upgradient and downgradient area. Once the extent and level of contamination is determined, the strategy may guide WSDA toward more extensive monitoring, depending on vulnerability factors.

Identification of the *source* of the contamination is key to identification of effective response actions. Because identifying the *source* of contamination can be a complex and expensive process, WSDA does not plan to initiate that effort unless the contaminant concentration is a least 20 percent of the numeric Ground Water Quality Criterion or the narrative standard. WSDA will work with registrants, producers and applicators as a

source of expertise in local pesticide use and as a possible source of funding for monitoring. The time frame for identifying the source will be dependent to some degree on the level of contamination. Typically, WSDA will attempt to identify the source within twelve months of the initial detection. If contamination is found in a Source Water Protection area, WSDA will consult DOH and determine a time frame that will meet both agencies' needs. As contamination approaches the Enforcement Limit, the time in which effective response actions must be identified becomes shorter.

EVALUATION MONITORING

After WSDA has implemented management measures to control contamination in an area, WSDA will conduct or require "evaluation monitoring" to determine if those management measures are working. Under the Ground Water Quality Standards, WSDA needs to be able to evaluate the reliability of management measures in meeting the Standards [WAC 173-200-080(4)(d)]. WSDA will develop or approve a Quality Assurance Project Plan for evaluation monitoring that ensures implementation of appropriate methods for evaluating the success of management measures

Evaluation monitoring can take several forms. Although ground water monitoring is the most direct approach to evaluating measures, it may take a long time for a positive or negative change in concentration to be measurable over a large area. Ground water monitoring may also be very expensive. As discussed previously, indirect measures such as vadose zone monitoring have advantages in measuring contamination at a site before it reaches the ground water and are less expensive than sampling an aquifer. Once the effectiveness of a management measure has been established through site-specific data, the adoption of that measure over a broad area can be monitored through applicator surveys and evaluation of pesticide sales/use records and would allow the amount of long-term ground water monitoring to be reduced.

The support of commodity groups and the pesticide industry will be a factor in the type of evaluation monitoring that can be implemented. By supporting surveys and similar evaluation efforts, commodity groups can play an important role in assessing the effect of the management strategies. WSDA may also ask pesticide registrants to fund monitoring to evaluate management measures.

QUALITY ASSURANCE

WSDA is committed to basing it pesticide management decisions on data that are suitable for their intended use. The policies and procedures that WSDA uses to fulfill that commitment are contained in the Quality Management Plan of May 9, 2001, which has been approved by EPA. The Department's quality assurance systems are reviewed on a regular basis and revised as needed. A similar QMP has been approved for the Department of Ecology. Where Ecology is the lead for a monitoring project, WSDA will coordinate with them during its development.

One of the purposes of quality assurance is to ensure that there are clear lines of communication and decision-making for the development, quality control assessment, and use of data. Because the WSDA Assistant Director - Pesticide Management Division has been delegated regulatory authority and will be making the decisions on the actions to implement, the AD will be consulted regarding the development of data upon which his decisions will later be based. In consultation with the Interagency Ground Water Committee, WSDA Water Quality Program staff will be responsible for assessing the suitability of data.

All new environmental data generated by WSDA will be of known and documented quality as defined in Quality Assurance Project Plans. QAPPs describe the intended data uses, the level of quality to be obtained, and data acceptance criteria for field, laboratory, and data management activities for any monitoring projects in which samples are collected. For example, data that will be used as a basis for regulatory action will be of the highest quality and have the strictest acceptance criteria. A critical aspect of a QAPP for ground water monitoring would be the criteria and design for selecting or locating wells so that samples will provide representative information for WSDA decision-making. As part of the quality assurance work, WSDA will rely on Ecology to continue its work on standardization of data so that it is consistent with EPA's minimum set of data elements.

MANAGEMENT MEASURES

This section describes the management measures that are currently in place or are available to WSDA. The rationale for choosing particular measures is described in Chapter 7. The philosophy of ground water protection in Washington State focuses first on prevention of future ground water contamination, and second, on minimization and mitigation of existing pesticide ground water contamination. Regardless of whether pesticides are found to be present in ground water, prevention has been and will be the foundation upon which ground water protection programs and efforts are based. The pesticide-specific management plans will emphasize prevention and management measures that reduce the risk of ground water contamination. WSDA may use non-regulatory approaches to ensure the quality of the state's ground water through the PMP process. However, regulatory approaches such as state use restrictions and geographical bans will be used if it is determined that an agricultural chemical poses a serious threat to ground water. WSDA, has a good track record of taking regulatory actions to limit or remove use of agricultural chemicals when it is verified that those chemical pose a danger to the quality of the ground water resource in the State.

WSDA will place greater emphasis on prevention efforts until an expanded monitoring program that can identify problem areas is implemented. The Department will use the vulnerability assessment to prioritize prevention programs in areas of high and moderate vulnerability. Programs that likely will be prioritized in these vulnerable areas include: the Chemigation and Fertigation Technical Assistance Program, development of Best Management Practices, and pesticide applicator Certification and Training. Outreach to commodity, industry, and other interested groups will be a priority in vulnerable areas.

The exact emphasis on various voluntary - and possibly regulatory - prevention measures will be described in pesticide-specific plans that will be developed through a public process described in Chapter 8.

VOLUNTARY PREVENTION APPROACHES

There are a variety of ongoing efforts in Washington State working towards preventing ground water contamination. WSDA staff recognizes prevention measures must be "do-able" from the producer, grower and applicator's perspective. Ultimately, it is the acceptance and implementation by the agricultural community that will produce the desired end result. Additionally, increased cost and effort to use the pesticides should be supported by a significant reduction in risk to ground water. Voluntary prevention approaches include education and training, community outreach, risk reduction measures, and compliance and technical assistance.

Education and Training

Education will be a major component of Washington's ground water protection strategy. It must include both a broad based approach to building awareness of ground water issues by all users of pesticides and target specific groups with more detailed and technical information. The education element should also address areas such as Integrated Pest Management and Sustainable Agriculture. Educational tools include the WSU Pesticide Education And Recertification Programs, PMP workshops, industry and commodity group meetings, and WSDA's newsletter *Pesticide Notes*.

WSDA Certification and Training Section

The Certification and Training section of WSDA's Pesticide Management Division is responsible for managing the pesticide licensing and recertification programs for individuals who apply, distribute or consult on the use of pesticides. WSDA's licensing program includes nine license types and more than twenty exam categories. Once licensed, an individual must either acquire the required number of recertification credits or retest in order to maintain his or her license.

WSDA works with Washington State University Cooperative Extension to produce study manuals for the various pesticide exams. Both the study manuals and exams address environmental concerns, including ground water. WSDA participates in the annual planning of the WSU sponsored programs and has input into the topics addressed. WSDA also provides speakers for the recertification courses. Since its inception, the WSDA Water Quality Protection Program has presented a course on water quality and pesticides at many of the recertification courses held around the state.

PMP Workshops

WSDA staff plan to develop and hold PMP workshops once the federal rule becomes final. Additionally, WSDA staff will participate in workshops upon request to discuss the

pesticide-specific state management plans. Workshops may target growers in vulnerable geographic areas, particular pesticides or certain types of agriculture such as irrigated crops.

Commodity Group Meetings

There are many commodity groups in Washington State such as the Association of Washington Wheat Growers and the Washington Apple Commission. These groups are helpful to their members in many ways. Most have annual meetings and newsletters to keep their membership informed on different issues including new regulations. These commodity groups provide an excellent opportunity to work with and educate specific groups of growers about the pesticide-specific management plans and the associated best management practices.

Industry Meetings

Many pesticide user groups hold annual meetings where speakers present a variety of topics of interest to their organization. Often these groups offer recertification credits for a portion of the talks relating to pesticides. WSDA and WSU Cooperative Extension often provide speakers for some of these meetings or for in-house training sessions for employees. WSDA staff will use these opportunities to discuss general ground water protection, and provide specific information about the PMP process.

Agency Newsletter

"Pesticide Notes" is a newsletter published on an occasional basis by WSDA's Pesticide Management Division. The newsletter contains information on Division activities, regulatory issues and new regulations. The newsletter is mailed to all pesticide license holders and others on the mailing list. "Pesticide Notes" has a circulation of approximately 23,000 per issue and is published in both English and Spanish. The newsletter will be used to communicate ground water information to pesticide users.

Community Outreach

Community outreach efforts such as the Master Gardener Program and presentations to interested groups and pesticide users, will be directed to the public as well as the regulated community. Pesticide-specific management plan information, requirements, restrictions and updates will be disseminated to the general public and regulated community through industry newsletters, directed mass mailings, radio announcements, newspaper articles, and public meetings. Notification when a public water supply system is impacted will be accomplished as needed by the state Department of Health.

Master Gardener Program

The Master Garden Program administered by WSU Cooperative Extension offers a chance to educate the home and garden pesticide user. Master gardeners assist Cooperative Extension in educating and assisting homeowners and gardeners with questions concerning lawns, gardens and ornamental plants.

Presentations to Interested Groups

Presentations to the general public and interested groups will provide a basic introduction to the state's efforts to protect ground water from pesticides as well as the concept of pesticide-specific state management plans. Presentation length, content and style will be tailored for the different audiences as appropriate.

Residential Pesticide Users

In the past WSDA has developed educational materials on proper pesticide use, storage and disposal for the home and garden user. These materials consisted of fact sheets, plastic placards for pesticide storage areas and plastic measuring cups to be used for properly measuring pesticides when mixing. The materials have been distributed by master gardeners, at home and garden shows and by several organizations.

Risk Reduction Measures

Pesticide risks may be reduced when pesticides are applied properly and prescriptively. Evaluation of risk reduction measures will be accomplished through applicator surveys, evaluation of sales and use records and monitoring. Risk reduction measures include the application of best management practices, Home•A•Syst and the State Department of Health's Wellhead Protection Program.

Best Management Practices (BMPs)

BMPs are methods or practices used to control or reduce point and nonpoint source pollution. BMPs provide a framework for integrated nutrient and pesticide management. The proper combination of BMPs in agricultural production systems provides protection of both ground and surface water at a site-specific level. Technical assistance is available to growers through existing programs administered by WSU Cooperative Extension, the Natural Resources Conservation Service, Conservation Districts and others. WSDA will support these efforts as they relate to the pesticide-specific management plans.

BMPs have an important role in WSDA's prevention and response strategies. Although Ecology has traditionally approved BMPs, WSDA will now be in the position of approving them for pesticides. WSDA will also be in the position of deciding if particular BMPs meet the Ground Water Quality Standards' definition of AKART in areas where contamination exists (see Chapter 2). Although BMPs are generally viewed as voluntary measures, the Ground Water Quality Standards acknowledge that BMPs can be mandatory. In certain contaminated areas, WSDA may make implementation of BMPs mandatory while they remain voluntary in other areas. WSDA will be responsible for evaluating the effectiveness of BMPs and may require more stringent measures if the BMPs are not successful in meeting the Ground Water Quality Standards. Chapter 7 discusses the criteria and rationale for selecting voluntary or mandatory measures. The development of BMPs and recommendations for restrictions will be accomplished by a WSDA-sanctioned workgroup. For a BMP or restriction to meet the AKART standard,

the workgroup and WSDA will need to balance the effectiveness of the practice in reducing contamination with its economic practicality. Depending on the geographic scope for BMP development, WSDA may convene local workgroups or have a standing workgroup. NRCS, WSU and Ecology will be prime participants in such a workgroup but WSDA may expand it to include other agencies and/or representative of agricultural, pesticide industry, and environmental organizations.

Home•A•Syst

Home•A•Syst is a ground water education and protection program developed by the WSU Cooperative Extension with funding support provided by EPA and Ecology. It is a modified version of the National Farm•A•Syst Program originating in Wisconsin and Minnesota in the late 1980s. It allows home and small farm owners to assess how their homestead practices may be affecting their ground water. In many cases this is also their drinking water source.

The program offers a series of fact sheets providing information and offering suggestions on BMPs. It also provides worksheets allowing individuals to rank their activities in relation to ground water protection. There are worksheets allowing property owners to evaluate their soil characteristics and develop an action plan to reduce high-risk activities.

Source Water Protection Program

The Washington State Department of Health administers Washington's Wellhead Protection Program. Mandated by amendments to the Federal Safe Drinking Water Act in 1986, the program applies to all federally defined public water systems using ground water as their source. This is a pro-active program intended to prevent contamination of ground water used for drinking water. It is an important preventative program that will be an integral part of PMP process.

Compliance and Technical Assistance

Compliance and technical assistance provides an opportunity for individuals to receive assistance from regulators in understanding and implementing regulatory requirements and pesticide-specific management plans. Compliance and technical assistance can help reduce violations by providing a better understanding of the requirements and specific actions required of the individual. Pesticide compliance and technical assistance is available through WSDA's Enforcement Program and the Chemigation and Fertigation Technical Assistance Program.

WSDA Chemigation and Fertigation Technical Assistance Program

The WSDA Chemigation and Fertigation Technical Assistance Program is administered from the Moses Lake office . The program was initiated in 1998 to protect ground water and to update agency rules on chemigation and fertigation. Two chemigation and fertigation specialists staff the Moses Lake office and work with growers in the field to protect water resources from the potential hazard of pesticides and fertilizers. WSDA hopes to increase

operator understanding of the potential impact irrigation activities have on ground and surface water, and convey the need for appropriate management practices through technical assistance.

REGULATORY APPROACHES

WSDA has the authority to impose regulations to prevent contamination and to respond to contamination. Regulatory approaches such as state use restrictions and geographical bans will be used if it is determined that an agricultural chemical poses a threat to ground water and those threats cannot be addressed through implementation of voluntary or mandatory BMPs or other management measures. Such actions would take place in the areas where contamination is confirmed. In other areas of similar or higher vulnerability where ground water monitoring has not yet been implemented WSDA will conduct assessments designed to determine the need for regulatory action. The Department can classify a pesticide as State Restricted Use if it poses a serious threat to ground water, even if ground water monitoring has not yet detected it in the State. Regulatory approaches may also be used if vadose zone monitoring indicates that a pesticide poses a threat to ground water. Where contamination is not decreasing and voluntary approaches are not successful in protecting the state's ground water from agricultural chemicals, then regulatory approaches will be used. Several regulatory options are available to WSDA to further control the use of pesticides in Washington State including pesticide reclassification, pesticide use restrictions and permitting. Regulatory solutions may be used when monitoring data supports the need. Most regulatory activities involve rulemaking and a public process.

Pesticide Reclassification

Pesticides posing a heightened risk to ground water resources will require intensive management and an adequate tracking mechanism if use is continued in Washington State. Classification of pesticide-specific management plan pesticides from general use to restricted use would provide a mechanism for tracking sales and use through record keeping requirements. All chemicals designated in the federal rule for the PMP process will be registered in Washington State as restricted use. For those pesticides not identified by federal rule, if voluntary preventive measures have not provided the degree of protection desired, the state will consider classifying a general use pesticide as state restricted use if the product is not already federally restricted.

Under WAC 16-228-1230, WSDA may classify a pesticide as state restricted use for the protection of ground water. This classification ensures the pesticide can only be distributed by licensed pesticide dealers to certified applicators or their duly authorized representatives. Additionally, only certified applicators or persons under their direct supervision can apply state restricted use pesticides.

Pesticide Use Restrictions

In areas where pesticides are not applied, impacts from pesticides to the environment should not occur. Where pesticides are applied according to the label and current state restrictions

but those controls still fail to prevent contamination, implementation of additional restrictions will be considered. These restrictions should reduce the amount of pesticides introduced into the environment and diminish the potential for pesticide leaching. Pesticide use restrictions include designating use prohibition areas, limiting pesticide use, limiting total amounts of pesticides applied, additional training requirements and setback areas.

Use Prohibition Areas

Use prohibition areas will be defined as those areas where due to the extreme vulnerability of the aquifer, WSDA determines there are no best management practices sufficient to protect the ground water.

Limited Use Areas

Limited use areas will include vulnerable aquifers where WSDA determines additional best management practices will be able to protect ground water resources, but where a "Use Prohibition" designation is not necessary. Limited use will also apply to areas having verified positive detections that have not responded to other voluntary preventive measures. Pesticide usage may be subject to the following limitations or restrictions:

- Restrict application method;
- Limit maximum application rates;
- Prohibit use on certain soil types;
- Prohibit use on certain crops;
- Limit timing of application; and
- Restrict type of formulation that can be used.

Setback areas

In consultation with DOH, WSDA may establish additional setback or buffer areas beyond the DOH wellhead protection zones. Buffer areas may also be designated around surface water features that are hydrogeologically connected to ground water recharge areas and identified as vulnerable or sensitive areas.

Permitting and Individual Plan Development

If the prevention measures listed above do not provide the level of protection desired or needed, permitting and individual plan development may be considered. Permitting and individual plan development will allow greater control and monitoring of pesticide usage. Record keeping combined with permitting or individual plan development will allow more precise tracking of pesticide use activities. This should allow investigators to precisely pin-point sources of contamination.

Permitting

For designated areas, applicators would be required to obtain a permit prior to making applications of certain pesticides. Permits would require the following information: name of applicator, name of landowner if different than applicator, mailing address, phone number, pesticide license number, application location, name and EPA registration number, method of application, date of application and any other information deemed appropriate.

Individual Plan Development

In extreme cases, it might make more sense to work with a particular applicator or landowner in the development of an individual plan to protect ground water from pesticide contamination. In these cases, the individual plan holder would be required to submit an individual management plan for approval prior to applying a pesticide targeted by the PMP process. Individual plans would consist of a map of the geographical area showing location of structures, mixing and loading areas, pesticide storage areas, cropping areas, bodies of water, roads, legal description, soils, organic matter, ground water distribution and depth and location of wells. The plan would also require:

- Discussion of the pertinent environmental characteristics;
- Identification of vulnerable and/or sensitive areas based on soils and ground water location and depth;
- Details of pesticide application including mitigation measures for areas identified as moderate to high risk because of environmental conditions;
- Identification, location and risk assessment of wells; and
- Emergency response plan.

Although many of the regulatory strategies discussed in this section have been used successfully by WSDA, agency staff will continue to emphasize preventative strategies. WSDA will also coordinate efforts to protect ground water with other agencies and programs to make best use of limited resources. Coordination mechanisms such as the Interagency Ground Water Committee will be used to achieve this end.

Finally, a discussion of prevention measures is incomplete without the mention of research. Research on pesticide movement in soils and application methodology is an important element of prevention programs. It results in better management practices and vulnerability assessment tools. WSDA will continue to encourage and support research in this area by universities, private industry and others through written support to granting authorities.

CHAPTER 7
RESPONSE PROCEDURE AND ENFORCEMENT MECHANISMS

This chapter addresses the response and enforcement mechanisms WSDA will use as part of the PMP process to protect ground water in Washington State. The response section of this chapter outlines the reference points and the procedure WSDA will use to respond to pesticide detections in ground water. There are four levels of response beginning with level 1: a detection limit at or below 20 percent of the reference point, to level 4: detections up to 100 percent of the reference point. These four levels of response are detailed in Table 17, Description of Response For Detections of PMP Pesticides in Ground Water.

The enforcement section discusses the enforcement options available to WSDA to protect ground water from pesticide contamination due to agricultural applications and other sources.

RESPONSE

The PMP serves as a state process addressing a prevention and response approach specific to pesticides. WSDA is the lead in implementing the PMP, however this task will be accomplished in coordination with other agencies and the agricultural sector.

LEGAL FRAMEWORK

Under FIFRA and Washington State Pesticide laws and rules documented in Chapter 3, *Roles and Responsibilities and Legal Authorities*, WSDA is the primary agency responsible for responding to a pesticide detection, while DOH responds to pesticide detections in public water systems. Coordinating a response to detections will occur within the framework of the IGWC.

REFERENCE POINTS

To protect ground water resources, the EPA uses SDWA-based numbers such as Maximum Contaminant Levels (MCLs), Health Advisory Levels (HALs), or other approved health-based reference points. These numbers are used to evaluate the effectiveness of federal or state prevention and enforcement programs. Reaching the MCL or other designated reference points would be considered a failure of the prevention program.

WSDA will use both the numeric and narrative standards of Chapter 173-200, WAC, Ground Water Quality Standards for the State Of Washington as reference point(s). Chapter 173-200 WAC is a regulation based upon the statute Chapter 90.48 RCW, Water Pollution Control. The Ground Water Quality Standards apply to all activities that potentially impact ground water quality within the State of Washington. These activities include those for which the Department of Ecology does not have direct enforcement authority such as pesticide and fertilizer distribution and use, which resides with WSDA.

Implementation and enforcement of the Ground Water Quality Standards for general agricultural activities is handled through a 1987 memorandum of understanding (contract number 6500-64601 between WSDA, Ecology and Health) entered into under the authority of Chapter 173-200-080(7)(b) WAC. WSDA can use both the numeric criteria and narrative standards of Chapter 173-200 WAC to protect ground water quality as necessary from agricultural activities for which it has jurisdiction.

As specified in this document it is the Department's intent to use the groundwater quality narrative standards and numeric criteria to define the reference points WSDA staff will use to respond to pesticide detections in ground water. However, it is the intent of WSDA to manage pesticide use in Washington State according to the exemptions provided in Chapters 173-200-010(3)(a) WAC.

1. *Contaminant concentrations found in saturated soils where those contaminants are chemicals or nutrients that have been applied at agronomic rates for agricultural purposes if those contaminants will not cause pollution of any ground water below the root zone.*

NUMERICA CRITERIA AND NARRATIVE STANDARDS

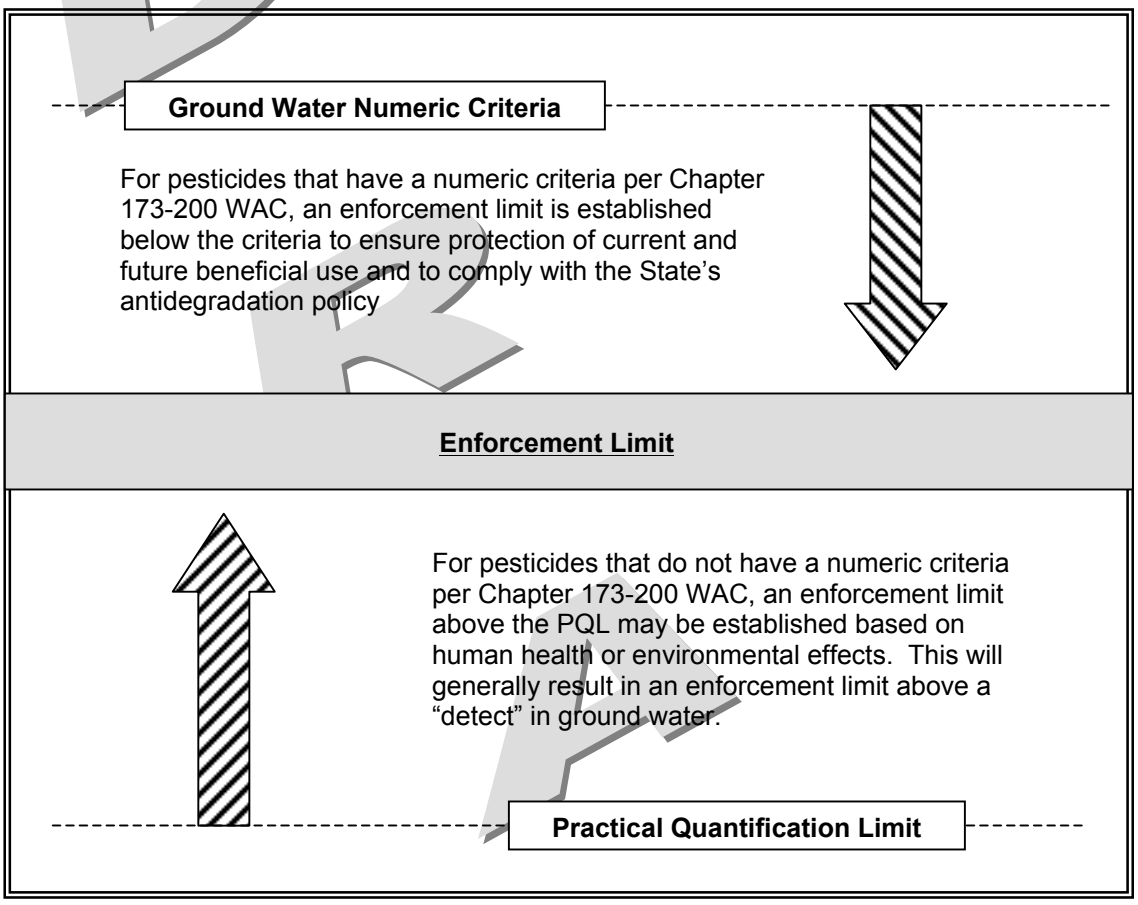
Many of the pesticides in use today, or that have been of concern in the past have established numeric criteria within the Ground Water Quality Standards. In general the criteria established for these pesticides equate to the US Environmental Protection Agency's Maximum Contaminant Levels established for drinking water. The Ground Water Quality Standards establish numeric criteria for fifteen additional pesticides for which US EPA has no MCL or Maximum Contaminant Level Goals (MCLG). Additionally, for pesticides that are not directly specified in the numeric criteria and for which US EPA has no MCL established, the Ground Water Quality Standards specify the Practical Quantification Level (PQL) be used as the reference point (Chapter 173-200-050(4)). Washington State Department of Ecology publication #96-02, *Implementation Guidance for the Ground Water Quality Standards* provides PQL's for an additional 20 pesticides.

The PQL for a pesticide is the lowest level that a laboratory can reliably detect concentrations in ground water and reflects the sensitivity of a particular analytical method adopted by Ecology. A different analytical method may provide a much lower quantification level that the one adopted by Ecology.

For the purposes of regulating a contaminant, either the numeric criterion or PQL is used to establish an "enforcement limit" and an "early warning value" which are defined on a case-by-case basis. Early warning values provide early detection of increasing contaminant concentrations that may approach or exceed enforcement limits and are typically set at 50% of the enforcement limit. For contaminants without a numeric criterion, the Ground Water Quality Standards allow for the enforcement limit to be higher or lower than the PQL to reflect human health and environmental information.

WSDA, in consultation with Ecology and the Department of Health, (will) consider that type of information before using the PQL as the enforcement limit.

Figure 8: Establishment of Enforcement Limits for Pesticides With and Without Numeric Criteria



Because PQLs are set by a particular analytical method, WSDA may use a more sensitive analytical method or an indirect sampling technique such as vadose zone monitoring combined with modeling to measure contamination trends toward the PQL. Table X below provides the various reference levels that WSDA will use to protect ground water resources[8]. WSDA will establish an enforcement limit for a specific pesticide when contamination exceeds 20% of pesticide's numeric criterion or PQL and when the source of contamination is likely to be from current, legal use of the pesticide. A pesticide-specific PMP will contain more details on the need for WSDA to establish an enforcement limit and an early warning value for that pesticide.

According to the Ground Water Quality Standards, enforcement limits are measured at a "point of compliance." The point of compliance needs to be "in the ground water as near the source as technically, hydrogeologically, and geographically feasible." [WAC 173-200-060(1)(a)] While the regulations allow for an alternative point of compliance,

WSDA will generally consider the point of compliance to be the upper-most level of the water in the aquifer beneath areas where the pesticide is applied.

Table 17 below provides the various reference levels that WSDA will use to protect ground water resources[6].

Table 17. Federal and State Reference Levels for Ground Water Protection

Pesticide / Herbicide	MCLG (ug/L)	MCL (ug/L)	Washington State Ground Water Numeric Criteria (ug/L)	EPA Method	Washington State Ground Water PQL's (ug/L)	Pesticide Uses
Acenapthene				8270 8100	10 200	Fungicide Insecticide
Acrolein				8270 8100	10 200	Herbicide Rodenticide
Acryonitrile			.07	8030 8240	5 5	Fumigant Insecticide
Alachlor	zero	2	2			Herbicide
Aldicarb			3			Acaricide Insecticide Nematocide
Alidicarb sulfone			3			Insecticide Nematocide
Alidicarb sulfoxide			4			
Aldrin			.005			Insecticide
Atrazine	3	3	3			Herbicide
Azobenzene			0.7			Acaricide
α-benzene hexachloride (α-BHC)				8080 8250	0.05 10	Insecticide Rodenticide
β-benzene hexachloride (β-BHC)				8080 8250	0.05 40	Insecticide Rodenticide
γ-benzene hexachloride (γ-BHC)				8080 8250	0.1 30	Insecticide Rodenticide
δ-benzene hexachloride (δ-BHC) (see Lindane)						
Bromomethane (Methyl bromide)				8010 8240	20 10	Fungicide Insecticide Herbicide Nematocide

[6] PQLs presented in Table X are not intended to represent the entire pesticide population. Additional PQLs will determined as needed.

Pesticide / Herbicide	MCLG (mg/L)	MCL (ug/L)	Washington State Ground Water Numeric Criteria (ug/L)	EPA Method	Washington State Ground Water PQL's (ug/L)	Pesticide Uses
Bromomethane (Methyl bromide)				8010 8240	20 10	Fungicide Insecticide Herbicide Nematocide
Bromomethane (Methyl bromide)				8010 8240	20 10	Fungicide Insecticide Herbicide Nematocide
Carbazole[7]			5			Insecticide
Carbofuran	40	40	40	.		Fumigant Insecticide
Carbon disulfide				8240	5	Adjuvant Fumigant
Carbon tetrachloride (tetrachloromethane)	zero	5	5			Fumigant Insecticide
Chlordane	zero	2	2			Banned Termiticide
Chlorobenzene	100	100		8010 8020 8240	2 2 5	
Chlorthalonil			30			Fungicide
Cyanide (free cyanide)			0.2			
2,4-D	70	70	70			Herbicide
Dalapon	200	200	200			Herbicide
p,p'-DDD			0.3			Insecticide
p,p'-DDE			0.3			Insecticide
p,p'-DDT			0.3			Insecticide
Diallate			1	8270	10	Herbicide
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.2	0.2			Fumigant
(EDB) Dibromoethane 1,2-			0.001	8010 8240	10 5	Fumigant Insecticide Nematicide
o-Dichlorobenzene	600	600	600	8010 8020 8120 8270	2 5 10 10	Herbicide
p-Dichlorobenzene	75	75	75	8010 8020 8120 8270	2 5 15 10	Fumigant

[7] Insecticide, Nirosan. 1,3,6,8 tetranitro carbazole

Pesticide / Herbicide	MCLG (mg/L)	MCL (ug/L)	Washington State Ground Water Numeric Criteria (ug/L)	EPA Method	Washington State Ground Water PQL's (ug/L)	Pesticide Uses
1,2-Dichloroethane (ethylene chloride)	zero	5	5	8010 8240	0.5 5	Fumigant Insecticide
Dichloromethane (methylene chloride)	zero	5	5	8021 8260		Fumigant Insecticide
(2-4D) Dichlorophenoxyacetic acid			70	8150	10	Herbicide
Dichloropropane 1,2-			5	8010 8240	0.5 5	Adjuvant Fumigant
Dichloropropene cis-1,3-				8010 8240	20 5	Fumigant Nematicide
Dichloropropene trans-1,3-				8010 8240	5 5	Fumigant Nematicide
Dichlorovos			0.3			Acaricide Insecticide
Dicofol				8081		Acaricide Insecticide
Dieldrin			0.005	8080 8270	0.05 10	Insecticide
Dinoseb	7	7	7	8150 8270	1 10	Herbicide
Diquat	20	20	20			Herbicide
Disulfoton				8140 8270	2 10	Acaricide Insecticide
Endosulfan I				8080 8250	0.1 10	Insecticide
Endosulfan II				8080	0.05	Insecticide
Endosulfan sulfate				8080 8270	0.5 10	Insecticide
Endothall	100	100	100			Herbicide
Endrin	2	2	2	8080 8250	0.10 10	Insecticide **(Banned)**
Endrin aldehyde				8080 8270	0.2 10	Insecticide
Ethylbenzene	700	700	700	8020 8240	2 5	Adjuvant
Folpet			20			Fungicide
Furmecyclox			3			Fungicide
Glyphosate	700	700	700			Herbicide
Heptachlor	zero	0.4	0.4	8080 8270	0.05 10	Termiticide **(Banned)**
Heptachlor epoxide	zero	0.2	0.2	8080 8270	1 10	Breakdown of hepatachlor

Pesticide / Herbicide	MCLG (mg/L)	MCL (ug/L)	Washington State Ground Water Numeric Criteria (ug/L)	EPA Method	Washington State Ground Water PQL's (ug/L)	Pesticide Uses
Hexachlorobenzene	zero	1	1	8120 8270	0.5 10	Fungicide
Hexachlorobutadiene				8120 8270	5 10	Fungicide
Isodrin				8270	10	Insecticide
Lindane	0.2	0.2	0.2	8080 8250	.05 10	Insecticide
Methoxychlor	40	40	40	8080 8270	2 10	Insecticide
Mirex			0.05			Insecticide
Naphthalene				8100 8270	200 10	Fumigant Insecticide
Oxamyl (Vydate)	200	200	200			Insecticide
Parathion				8270	10	Acaricide Insecticide
Pentachlorophenol	zero	1	1	8040 8270	5 50	Defoliant Herbicide Fungicide Insecticide Molluscicide
Picloram	500	500	500			Herbicide
Simazine	4	4	4			Herbicide
Silvex (2,4,5-TP)	50	50	50	8150	2	Herbicide
Tetrachloroethylene	zero	5	5			Adjuvant Fumigant
Toxaphene	zero	3	3	8080 8250	2 10	Insecticide
1,2,4-Trichlorobenzene	70	70	70	8270	10	Herbicide
1,1,1-Trichloroethane	0.2	0.2	0.2	8240	5	Adjuvant Fumigant
Trichloroethylene	zero	5	5	8010 8240	1 5	Adjuvant Fumigant
Trichlorophenol			4	8040 8270	5 10	Fungicide
Xylenes (total)	10000	10000	10000	8020 8240	5 5	Adjuvant

Chapter 173-200-050 establishes when and how an enforcement limit is to be established for any potential contaminant. In most cases the enforcement limit will be a level established by statistical methods for isolated, discrete contamination, or a percentage of the numeric criterion when contamination is area wide. For contaminants for which there

is no numeric criteria, the PQL will be considered to be the initial enforcement limit until human health or environmental limits can be established.

RESPONSE PROCEDURE

The response procedure for the PMP process begins when WSDA receives a reliable ground water test result indicating the presence of a pesticide included in the PMP process.

WSDA will ensure that the well owner/user will be notified of the test result in writing and health-related information will be provided if the information exists. The responsible sampling party will send a letter explaining the sample results and location to the Washington State Departments of Agriculture, Ecology and Health as well as the relevant local health district.

In responding to detections found at public drinking water systems, the State Department of Health has the lead in regulating the water provider. If a pesticide is found by a community water system at or above the MCL[8], the purveyor is required to provide newspaper notice within 14 days and direct mail notice to consumers within 45 days of the violation. Other types of public water systems, such as "transient non-community systems" and "Group B water systems" have similar notification requirements (see WAC 246-290-495 and WAC 246-291-360). Community water systems are required to provide customers with an annual "consumer confidence report" that, among other things, lists contaminants detected in their water (see WAC 264-290-72001). When contamination at or above an MCL is found, the purveyor must notify the Department of Health, determine the cause of the contamination, and take action as directed by DOH. For contaminants that do not have an MCL, DOH determines the follow-up action for the water system. ~~The~~ Data received by DOH will be provided to WSDA and will be useful for the PMP efforts.

For private wells, the Washington State Department of Ecology has provided drinking water, on a temporary basis, in the past in cases where MCLs have been exceeded. This is not a uniform policy and water users may be responsible for providing their own alternative sources of drinking water until a permanent solution is found to correct a problem. As stated previously, WSDA will ensure that the well owner/user will be notified of the test result in writing- and health-related information will be provided if the information exists. See also Chapter 8 for more discussion of monitoring data dissemination."

Detections above the analytical detection limit will result in some type of recommended response as illustrated in Table 17, Description of Response for Detections of PMP Pesticides in Ground Water. WSDA will implement a combination of actions depending on the pesticide detected, the concentration, and the source of contamination. At concentrations below 20% of the enforcement limit for a pesticide, efforts will focus on

[8] WDOH uses the federal MCL as basis for action. In most cases the MCL will equate to the Ground Water Quality Standards criteria, except for compounds for which no criteria exists.

notification, education, and better definition of the extent and magnitude of the contamination. Detections above 20% of the enforcement limit will bring additional, more intensive effort to determine the source of the contamination and, if it is found to come from current legal use of the pesticide, to implement BMPs that meet the AKART standards of efficacy and economic practicality. Identification of the source of the contamination is key to identification of effective response actions but it can be a complex and expensive process. WSDA will work with pesticide registrants, producers, and applicators to determine the source. Contamination between 50% to less than 100% of the enforcement limit will result in even greater monitoring to closely track contamination trends and to evaluate the effectiveness of BMPs or other management measures. If monitoring shows that these actions are not effective in reducing contamination or if contamination is increasing, more stringent measures will be implemented. When contamination from current legal use meets or exceeds 100% of the enforcement limit, WSDA will prohibit use in the area of contamination.

The time frame in which action is implemented will depend on several factors. The risk to human health or sensitive ecosystems is a primary consideration and WSDA will consult with DOH or Ecology in that regard. If contamination above 100% of the enforcement limit is discovered, prioritization of investigational resources to determine the source of contamination and emergency rule-making will allow the Department to take action typically within 12 months. Emergency rule-making must be followed by permanent rule-making which typically takes six months to a year. For lower concentrations where human or environmental health is not at immediate risk, identifying the source of contamination, then developing effective BMPs, and then having them voluntarily adopted by pesticide users may take two to five years.

WSDA will decide exactly what BMP or pesticide regulatory action to put in place based on available information that it is likely to meet the AKART standards of efficacy and economic practicality. WSDA's ability to evaluate the effectiveness of particular measures will be a factor in which measures are chosen. As discussed in Chapter 6, the development of BMPs and recommendations for regulations will be accomplished by a WSDA-sanctioned workgroup. Chapter 6 also discusses the rationale for choosing various pesticide regulatory actions such as use prohibition areas, limited use areas, setback areas, permitting, and individual plan development.

The geographic area in which management actions are taken will depend on vulnerability and monitoring results. When an ground water within area is found to be contaminated from current, legal use of a pesticide, WSDA will also consider which management actions should be implemented State-wide and in other areas of similar vulnerability to prevent other contamination problems. In areas where monitoring has detected no pesticide in ground water, WSDA will generally rely on education and voluntary implementation of BMPs for prevention. Exceptions will be made if conditions in an area are similar to areas where detects have been confirmed and there is good evidence to suggest the area is highly vulnerable. In this case the agency will consider mandatory actions to prevent the area from becoming contaminated. Another option is to

concentrate education in those areas and heavily promote voluntary implementation of BMPs. Increased monitoring priority will be given to these areas.

Table 18: Description of Response for Detections of PMP Pesticides in Ground Water

ENFORCEMENT LEVEL 1	RESPONSE
At or above the analytical detection limit yet below 20% of the Ground Water Quality Criteria or if no criteria exists then default to PQL	1. Notify well owner(s) of detection. 2. Educate pesticide applicators within area. 3. Evaluate use practices, soils, geology, and vulnerability within vicinity of site. 4. Review state records for previous point source or potential FIFRA violation concerns. 5. Evaluate existing monitoring data or retest within area to check for previous detections and trends. 6. Conduct timely outreach in local area applicable to relevant data and information. 7. Determine enforcement limit based on human health and/or environmental risks. * Vulnerability of area and review of historical data may have previously occurred as a result of general assessment activities.
ENFORCEMENT LEVEL 2	
Detection at 20% to less than 50% of the enforcement limit	(In addition to 1 through 7 above) 8. Monitor additional wells in the upgradient and downgradient area. 9. Conduct additional monitoring over time. 10. Work with registrant, producers and applicators to determine source. 11. Initiate BMPs on a voluntary basis. 12. Evaluate BMPs
ENFORCEMENT LEVEL 3	
Detection at 50% to less than 75% of the Ground Water Quality Criteria or Narrative Standard	(In addition to 1through 12 above) 13. Initiate mandatory BMPs as needed. 14. Install monitoring wells if resources are available. 15. Initiate effectiveness monitoring related to BMPs . 16. Monitor quarterly for determination of seasonal trends and fluctuations in concentrations. 17. Re-evaluate 18. Assist homeowner with health information and alternatives for attaining a safe water source if needed. 19. Obtain financial and technical assistance from pesticide registrant.
ENFORCEMENT LEVEL 4	
Detection at 75% to less than 100% of the Ground Water Quality Criteria or Narrative	(In addition to 1 through 19 above) 20. Implement Site Specific Permitting 21. Establish Use Prohibition Area(s). 22. Determine effectiveness of regulatory actions. 23. Initiate enforcement action if source can be determined

WSDA will base its decisions on the best available information, research, and professional expertise. Chapters 3 and 4 describe the support many agencies and organizations will provide. They include USGS, NRCS, Ecology, the Washington

Agricultural Statistics Service, Department of Health, WSU, the State Conservation Commission, commodity groups, pesticide industry groups, and environmental organizations. See Chapter 8 for more details on public involvement in PMP development and decision-making under a PMP.

Control strategies in these plans will be based on patterns of detections in a geographic area or vulnerability assessments, not on isolated detects of pesticides. The patterns of detections provide information about the source of contamination. If the contamination is in a large area where the same vulnerability and pesticide use patterns exist, it is likely to be from normal use of the pesticide. Isolated detections - especially at high concentrations - may be indicators of spills, illegal disposal, or illegal use. If WSDA's investigation of the source of contamination indicates that it is from illegal use, a pesticide misuse investigation will be initiated and enforcement action will be taken if a violation is documented. If indications are that the contamination came from a spill or illegal disposal, WSDA will refer the matter to Ecology for investigation under State hazardous waste laws. When determining the source of contamination, WSDA will examine monitoring data for detection patterns, ground water vulnerability information, current and historic use practices for the pesticide, potential point sources, and any other relevant information.

ENFORCEMENT

A strong commitment to enforcement of regulations is essential for successful implementation of the pesticide-specific state management plans. This includes the ability to enforce existing regulations pertinent to ground water protection and any special regulations developed as a result of the PMP process. In Washington State, three state agencies have regulatory authorities relating to ground water protection as documented in Chapter 3, *Roles and Responsibilities and Legal Authorities*.

Through a work agreement with EPA Region 10, WSDA has the primary regulatory responsibility in Washington State for implementing FIFRA. WSDA has been working to enforce provisions of FIFRA for ground water quality protection through pesticide registration, certification and training, and enforcement. WSDA has field regulatory staff located in five offices in the state including Olympia, Moses Lake, Yakima, Wenatchee, and Spokane.

For PMP implementation, the WSDA Water Quality Protection Program will use existing agency enforcement staff and processes in the enforcement investigations, case review and enforcement actions.

PRODUCT REGISTRATION

Under the WSDA/EPA cooperative agreement, WSDA manages the registration of all pesticide products sold in Washington State. All pesticide registrations in the state must be in accordance with FIFRA and Washington State Pesticide Laws and Rules. WSDA coordinates with EPA Headquarters and Region 10 offices as well as the WSU Cooperative Extension and industry to implement this program. WSDA registers

pesticides under several different categories including general use, restricted use, FIFRA Section 24(c), and Section 18 registrations. All chemicals designated in the federal rule for the PMP process will be registered in Washington State as restricted use.

COMPLIANCE

The WSDA FIFRA Enforcement Program inspects and investigates the production, distribution, and use of pesticides to assure proper registration, storage, sale and use of these chemicals. Enforcement investigations are conducted under the provisions of both state and federal laws. The department can take enforcement action for violations discovered during an inspection. These enforcement actions can serve to educate the pesticide user population and prevent further violations. Under the WSDA/EPA cooperative agreement, WSDA provides mid-year and end of year reports to EPA on the progress of all FIFRA programs implemented by WSDA.

WSDA provides staff for training sessions in conjunction with the WSU Cooperative Extension Program and when requested, by grower or dealer groups. The field staff conduct test sessions throughout the state to evaluate and certify individuals who distribute and use restricted pesticides and apply general use pesticides for commercial purposes within Washington State. Violations of the state and federal pesticide statutes can result in enforcement actions. These actions can range from warnings to civil penalties.

Case Review

WSDA conducts formal case review in compliance with FIFRA and Washington pesticide laws and rules. If necessary, PMP cases will be blended into the enforcement and case review process.

Penalty Provisions

WSDA has a variety of penalties it can impose for violations of laws and rules. The penalties range from verbal warnings to the imposition of civil penalties. The Department of Agriculture is currently allowed to assess civil penalties of up to $7500.00 per violation. The Ground Water Quality Standards limit when an agency can assess a penalty. guidance on the implementation of the Standards[9] (p. 79) says:

> Enforcement through a compliance order or permit modification shall precede any civil or criminal penalty [WAC 173-200-100(8)] if a permittee violates the Ground Water Quality Standards but is in compliance with the best management practices adopted by the following rules: ... RCW 15.58.150(2)(c), Pesticide Control Act -- Pesticides shall be used according to label directions or according to the Washington State Department of Agriculture regulations ... WAC 16-228-180(1), Pesticide regulations -- A pesticide license may be denied, revoked or suspended if

[9] Washington State Department of Ecology Publication # 96-02, April 1996

> the provisions are violated. ... WAC 16-228-185, Pesticide regulations -- Restrictions on the holding, handling, using, or disposing of pesticides and their containers.

WSDA recognizes the intent of this regulation but envisions few circumstances where it would be a consideration for non-point source contamination. If contamination is found to exceed the Enforcement Limit, then WSDA will eliminate or restrict use in that area by a WSDA regulation. Non-compliance with that regulation will be enforced according to existing WSDA regulations and policies.

The State Departments of Agriculture, Ecology and Health, within their regulatory responsibilities, have provisions for levying penalties if necessary. These agencies write rules, develop policy, conduct routine inspections and complaint investigations, and take regulatory actions. They have the ability to assess civil penalties, and have trained enforcement staff available to implement the regulatory components of pesticide-specific state management plans. Investigations can be shared between agencies with joint jurisdiction or an investigation can be handed over to the agency with the strongest jurisdiction.

CHEMIGATION

The enforcement component of the WSDA Chemigation and Fertigation Technical Assistance Program entails conducting audits of irrigation systems used to apply pesticides and fertilizer. These technical assistance audits evaluate the installation of pollution prevention equipment on the irrigation systems to prevent agrochemical contamination of surface and/or ground waters. The audits and subsequent follow-up inspections give growers a chance to fix any portion of the system that is found to be out of compliance. This program increases compliance with the laws and regulations while reducing potential agrochemical contamination of Washington waters.

CHAPTER 8
PUBLIC AWARENESS AND PARTICIPATION

Washington's generic pesticide management plan is based on the 1992 document titled, "*Protecting Ground Water: A Strategy for Managing Pesticides and Nutrients*." (Ecology Publication # 91-42) This document is Washington State's official strategy for dealing with the issue of ground water contamination by pesticides. This strategy has been adopted by WSDA to meet EPA Pesticide Management Plan guidelines.

Development of the State strategy was started in December 1989 and completed in the fall of 1991. Ecology coordinated the development of the strategy with the participation of federal and State agencies and the public. An advisory committee played a strong role in strategy development. The committee included representatives from agricultural interests, environmental groups and other citizen groups. The committee also included representatives of regulatory agencies, agencies with education and technical assistance responsibilities and local governments.

A public review draft was distributed in May 1991 and a total of seven public meetings were held around the State to receive public comment. Written comments were solicited. Development of this strategy involved extensive public participation and forms the basis of Washington's Generic PMP.

WSDA will also solicit public comment on this Generic PMP. The public was not involved in writing the initial drafts since they are based on the 1992 Pesticide and Nutrient Strategy[10] which had considerable public input. The Generic PMP will be finalized after WSDA and EPA consider public comments on the document.

The development of pesticide-specific state management plans will be a public process. WSDA will involve other state agencies, local government, agricultural interests, environmental groups and others in the process. Public information meetings will be held to receive input and comment. Advisory committees or work groups representing broad interests will be assembled and used to help develop the pesticide-specific plans. Any rule-making to be done as part of the State Management Plans will be subject to the Washington State Administrative Procedures Act (Chapter 34.05 RCW). This statute ensures the public has access to the rule-making process. WSDA believes broad participation by the public and all affected parties is essential to successful plan development and implementation.

When the federal rule becomes final, WSDA staff will work with affected parties including commodity groups, grower and industry associations, and pesticide registrants and dealers. WSDA will also involve the WSU Cooperative Extension offices, Conservation District and NRCS offices in affected areas, WSDA field offices, affected individuals or groups, and the general public in the decision-making process.

[10] Washington State Department of Ecology publication # 91-42, April 1992

PLAN DEVELOPMENT, REVIEW AND DISSEMINATION

In the development of the pesticide-specific management plans, advisory work groups will be assembled with representatives from each of the affected areas including commodity groups and environmental representatives. These work groups will include local representatives in the effected areas of the state. Subsequent best management practices and requirements developed by these work groups and approved by WSDA will be documented and will be disseminated through PMP workshops around the state.

The decision as to which pesticide-specific management plans WSDA will develop will also involve public participation. Under the proposed federal PMP rule, if WSDA chose not to develop an EPA-mandated PMP for a specific pesticide, its sale and use would be illegal in the State on the effective date of the federal rule. Therefore, WSDA will develop a mechanism that ensures affected and interested parties will have an opportunity for input to WSDA's decision on whether or not to develop federally mandated PMPs.

PMP WORKSHOPS

PMP workshops will be held statewide to provide information and receive comments from growers and pesticide users regarding the pesticide-specific management plans. Ground water protection workshops will be held yearly in all regional areas of Washington State. The number, location, and frequency of workshops will coincide with the pesticide use patterns, the severity of contamination in the area, and the known need for specific information.

GROUP SPECIFIC WORKSHOPS

WSDA will conduct one-day workshops for groups and organizations desiring information on the PMP process and the pesticide-specific management plans. These workshops will be tailored to the specific needs of the requesting group or organization.

INFORMATIONAL MEETINGS

WSDA staff will hold public informational meetings to inform the general public of the PMP program and pesticide-specific management plans in affected communities. WSDA will use this opportunity to educate the public and gain input on the program's implementation and success. These meetings will be scheduled and planned as needed based on the prevention and response process.

MONITORING DATA DISSEMINATION

Well owners will be notified of any pesticide detections found in samples taken by the state or its contractors. They will also be provided with pesticide fact sheets for any pesticides detected. In cases where public water supply systems are involved, the State Department of Health standard notification procedures will be followed. Notification of the public may take the form of a public service announcement, direct mailings or other form of

communication determined to be the most appropriate and effective means by the State Departments of Agriculture, Ecology and Health. In areas where public drinking water supplies are not involved, WSDA, in consultation with the state and local Health Departments, will determine notification procedures.

WSDA in coordination with other agencies (through the IGWC) will develop an MOU(s) with "data holders" that will implement a process whereby water quality data related to pesticide detection will be forwarded to WSDA for the appropriate action and public notification.

CHAPTER 9
INFORMATION DISSEMINATION AND RECORD KEEPING

Pesticide users are responsible for controlling the use of pesticides. Therefore, it is important to communicate the overall PMP approach and the prevention and response measures to users, to people who provide advice on pesticide application, and to the general public. The plans themselves will be distributed at the local, state and federal levels. WSDA will use a variety of methods to inform people of management measures but will emphasize the pesticide applicator certification and training program. This chapter also describes the records of PMP implementation that WSDA will keep and the types of reports WSDA will use to keep EPA informed of PMP implementation activities.

PESTICIDE MANAGEMENT PLAN DISSEMINATION

The Generic pesticide management plan will be disseminated through the WSDA Water Quality Protection Program to the Washington State Departments of Fish and Wildlife, Ecology, Health, Natural Resources, the Washington State Conservation Commission, the U.S. Geological Survey, EPA, and the Washington State Library. When the federal rule becomes final, the generic state pesticide management plan will be mailed to interested parties. The plan will be available upon request from WSDA and will be distributed through pesticide applicator training sessions around the state. Initial public awareness of the plan will be accomplished through public notices, news releases, newspaper articles or notices, the WSDA pesticide newsletter and website, and presentations at industry-related meetings.

Once a pesticide-specific state management plan has been reviewed and approved by EPA, WSDA will disseminate the plan to affected commodity groups as well as the parties mention above. A fact sheet describing specific requirements or restrictions for each pesticide-specific management plan will be prepared and distributed. The fact sheets will be distributed to the Washington State Library, WSU Cooperative Extension offices, Conservation District and NRCS offices in affected areas, commodity groups, grower and industry associations, WSDA field offices, pesticide registrants and dealers, affected individuals, and parties or groups. Information on the plans will also be available on the WSDA website, and copies of individual plans will be available directly from WSDA upon request. Staff will also use the PMP workshops discussed in Chapter 8, Public Awareness and Participation to distribute pesticide-specific management plan information.

PESTICIDE USE INFORMATION DISSEMINATION

WSDA will use a combination of the mechanisms listed below to inform people of voluntary and mandatory pesticide management measures. The timing of these efforts will be based on WSDA's and DOH's evaluation of the risks from any contamination. Where high levels of contamination justify emergency rule-making to control pesticide use, WSDA will implement an immediate outreach effort that includes press advisories,

public meetings, and possibly mailings to licensed applicators and dealers in the affected area.

PUBLIC MEETINGS

WSDA will work with other state and federal agency staff and the conservation districts in conducting a series of public meetings within areas affected by the pesticide-specific management plan. These meetings will introduce, describe and explain the pesticide-specific management plan and its requirements. WSDA will conduct informational meetings for federal and state agency personnel as needed to provide detailed information on pesticide-specific management plan requirements.

WSDA will also be available to make presentations, answer questions and address concerns relating to the pesticide-specific management plan. Additional public meetings may be held as necessary to inform the public, area residents and pesticide users of plan changes and to answer questions.

EDUCATION AND TRAINING

The WSU pesticide education and recertification programs are designed to ensure the pesticide user receives information for the safe use of pesticides. The emphasis is on supplying the most up to date technical information to pesticide users to ensuring proper pesticide use and ground water protection. The annual WSU pesticide recertification program will be used as the primary vehicle to convey PMP requirements and information to licensed applicators. Recertification workshops are typically held between November and March in more than a dozen cities statewide. This program offers an excellent opportunity for the communication of new ground water protection requirements.

The most up-to-date technical information regarding pesticide use, contamination prevention, and monitoring results will be supplied to pesticide applicators through the WSU pesticide education and recertification program. WSDA can target specific categories of pesticide applicators who would likely use a PMP pesticide through the Department's certification database.

REGISTRANTS AND DEALERS

WSDA will ask registrants to play an active role in disseminating information through product stewardship programs. Dealers may be required to disseminate information to pesticide applicators concerning ground water protection statements on pesticide labels, voluntary management measures, and any state restrictions in their area.

WSDA NEWSLETTER

WSDA will use their newsletter "Pesticide Notes" to provide information on prevention, response actions, and monitoring information to pesticides users, consultants, and dealers. The newsletter is published once a year in June and contains articles on compliance,

health and safety, environmental, and registration issues. The newsletter is mailed to approximately 25,000 pesticide license holders and other interested people. WSDA also translates a summary of the agricultural issues into Spanish and mails that to licensees and pesticide handlers who have requested materials in Spanish.

PESTICIDE APPLICATOR AND DEALER INSPECTIONS

Compliance assistance will be available to private, commercial and government applicators upon request, providing an additional means of informing pesticide applicators of requirements, revisions, modifications and changes to the plan. Compliance with pesticide-specific management plans will also become a part of routine inspections.

RECORD KEEPING

Within WSDA, record keeping and reporting are essential components of all regulatory and management programs. WSDA will follow existing agency protocol for record keeping as well as the EPA enforcement-related record keeping requirements as related to pesticide and ground water contamination investigations. In general, information related to ground water and pesticides or the plans themselves will reside at the main WSDA office in Olympia, and managed by either the Compliance or Water Quality Protection Program staff. All state records are kept for seven years and are available during business hours.

WSDA staff will submit a report on the pesticide-specific management plans to EPA on a biennial basis. The purpose of this report will be to inform EPA of the progress and effectiveness of the pesticide management programs for ground water protection. This report will:

- Provide an assessment of the status of implementation efforts;
- Provide an assessment of the environmental effectiveness and the level of ground water protection provided by an implemented PMP; and
- Provide information to be used to help ensure national consistency of protection.

Before the report is submitted to EPA, a draft report will be provided to cooperating agencies for review and written comment. WSDA staff will also discuss important management plan issues during mid-year and end-of-year grant reviews by EPA and report on the use of EPA grant money for pesticide management plan activities. WSDA staff will also notify EPA of any significant changes to a pesticide-specific management plan, including significant monitoring and compliance program results.

APPENDIX ONE - ACRONYMS

AES	Agricultural Experiment Stations
AKART	All Known, Available, and Reasonable Methods of Prevention, Control and Treatment
ARC	Washington State University Agricultural Research Center
ARS	Agricultural Research Service Of USDA
BLM	United States Bureau Of Land Management
BMP	Best Management Practice
BOR	United States Bureau Of Reclamation
CARA	Critical Aquifer Recharge Area
CBIP	Columbia Basin Irrigation Project
CERCLA	Comprehensive Environmental Response Compensation And Liability Act
CREP	Conservation Reserve Enhancement Program
CSGWPP	Comprehensive State Ground Water Protection Program
CTED	(Washington State) Community, Trade and Economic Development Department
CWA	Clean Water Act
DNR	Washington State Department Of Natural Resources
DOH	Washington State Department Of Health
DOI	Department of Interior
DRASTIC	Depth to water, Recharge rate, Aquifer characteristics, Soils, Topography, Impact of vadose zone and hydraulic Conductivity model
EAP	Environmental Assessment Program
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ESA	Endangered Species Act
FACT	Food, Agriculture, Conservation And Trade Act
FARM*A*SYST	Farmstead Assessment System
FEQL	(Washington State University) Food and Environmental Quality Laboratory
FFDCA	Federal Food, Drug And Cosmetic Act
FIFRA	Federal Insecticide, Fungicide And Rodenticide Act
FQPA	Food Quality Protection Act
FTE	Full Time Equivalent (Employees)
FWS	Washington State Fish and Wildlife Service

FY	Fiscal Year
GIS	Geographic Information System
GLP	Good Laboratory Practices
GWAC	Ground Water Advisory Committee
GWMA	Ground Water Management Area
HAL	Health Advisory Level
IGWC	Interagency Ground Water Committee
IPM	Integrated Pest Management
JNRC	Governor's Joint Natural Resources Cabinet
KOC	Soil Adsorption Potential
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goals
MDL	Method Detection Limit
MOU	Memorandum Of Understanding
MTCA	Model Toxics Control Act
NASS	National Agriculture Statistics Service
NAWQA	National Water Quality Assessment Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPS	Nonpoint Source Program
NRCS	Natural Resource Conservation Service (Formerly SCS)
NRIS	Natural Resources Information System
OERR	EPA Office of Emergency and Remedial Response
OGWDW	EPA Office of Ground Water and Drinking Water
OPP	EPA Office of Pesticide Programs
OSW	EPA Office of Solid Waste
PADMS	Pesticide Application Data Management System
PIRT	Pesticide Incident Reporting And Tracking Panel
PMP	Pesticide Management Plan
PPB	Parts per Billion
PPD	Pesticide Properties Database
PPM	Parts per Million
PQL	Practical Quantification Limit
PRZM	Pesticide Root Zone Model
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation And Recovery Act

RCW	Revised Code of Washington
Rfd	Reference Dose
SARA	Superfund Amendments And Reauthorization Act
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SLN	Special Local Needs
SRO	Washington State Governor's Salmon Recovery Office
SSURGO	Soil Survey Geographic
STATSGO	State Soil Geographic Database
STORET	Storage And Retrieval System
TSCA	Toxic Substances Control Act Of 1976
UIC	Underground Injection Control Program
USDA	United States Department of Agriculture
USDA-ARS	United States Department Of Agriculture- Agriculture Research Service
USFS	United States Forest Service
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WCC	Washington State Conservation Commission
WDIS	Washington State Department Of Information Systems
WSDA	Washington State Department Of Agriculture
WSU	Washington State University

APPENDIX TWO – GROUND WATER IN WASHINGTON STATE[11]

In Washington State, ground water provides more than 65 percent of the drinking water consumed by its 5.6 million residents. It constitutes more than 25 percent of the total water used for drinking, industrial, commercial, and agricultural purposes. There are approximately 16,000 ground water dependent drinking water supply systems in the State. These systems constitute over 95 percent of the public water supply systems. It is estimated that there are 404,000 private wells serving 1,000,000 residences located primarily in the rural areas of the State.

Figure 1, Ground Water Used In Million Gallons Per Day

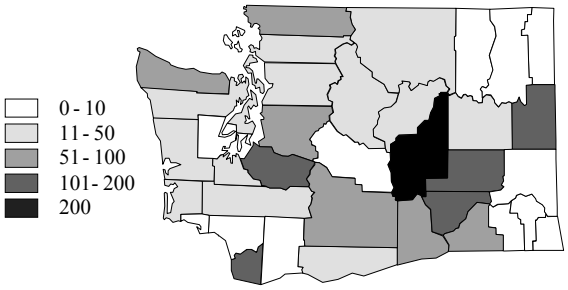
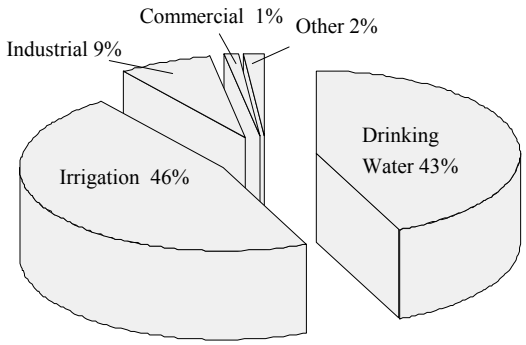


Figure 2, Ground Water: All Uses in Washington State



Ground water contributes significantly to Washington State's surface water bodies. It is estimated that baseflow contribution for Washington State's streams is 70 percent. Protection of the State's ground water resources is vital in maintaining instream flows and water quality during summer months. Currently, the State has issued water rights for the withdrawal of approximately 25 billion gallons of ground water a day. A major concern for the State is the expected increased demand on ground water as the population grows from current levels to an estimated 11 million by the year 2045.

Given the importance of ground water to the public health and economic development of the State, it is vital that this precious resource be protected and managed for current and future beneficial uses.

Washington State contains some of the most productive aquifers in the nation. The largest of these aquifers is the Columbia River Basalt Aquifer System located within 13,000 square miles of the central portion of the State. Two smaller but vital aquifer systems serve the Spokane (Spokane-Rathdrum Prairie Aquifer) and Puget Sound Area

[11] From *Safe Drinking Water Act, Section 1429 Ground Water Report to Congress, EPA-86-R-99-016 – October 1999*

(Puget Sound Aquifer System). Well yields in all three of these aquifer systems are substantial.

Generally, ground water quality in Washington State is good. However, several areas are documented where the beneficial use of ground water has been negatively impacted. These include areas of elevated nitrate within the Columbia Basin; elevated nitrate, EDB and other fumigant related compounds in Whatcom County; and TCE and metals in areas of Clark County. Nonpoint sources appear to be the most significant threat to ground water quality. Nitrate contamination of the State's aquifers is the most widespread problem encountered to date. Statewide, violations of the 10 mg/l nitrate-nitrogen drinking water standard for public supplies is estimated at 1.5 percent and for private ground water supplies 5-10 percent. This increases to 20-25 percent in some widespread areas.

Washington State has made significant efforts to protect its ground water resources. Approximately 19 percent of the State's 66,582 square miles are currently designated as 15 Ground Water Management Areas, for which special protective initiatives have or are being developed. Additionally, EPA has designated 11 areas as Sole Source Aquifers. Currently, 90 percent of the State's Group A ground water dependent public water supply systems are implementing wellhead protection programs. Under the State's Growth Management Act, local governments in each of Washington's 39 counties have designated critical aquifer recharge areas and defined relative vulnerability of these aquifers to establish protective land use restrictions.

FUTURE CONSIDERATIONS

Ground water protection programs in Washington State are hampered by the lack of several key components. This prevents evolution of existing ground water activities and impacts the degree to which ground water can be protected and managed in a comprehensive, coordinated fashion. Washington State needs additional funding to:

- ***Promote education and outreach programs.*** Public education is seen as the only effective method to address many current ground water quality problems. Without improved education and outreach programs, a large portion of the ground water problem related to nonpoint source activities will remain.

- ***Funding to establish a statewide ground water monitoring system and data repository***. There exists significant data "gaps" in the State where ground water information does not exist or is of questionable quality. This impacts timely and accurate planning and regulatory decisions.

- ***Funding to evaluate effectiveness of land use limitations and Best Management Practices (BMP's).*** Focused assessment of current land use ordinances and BMP's would help determine which are most effective in protecting ground water.

Through use of an Interagency Ground Water Committee, Washington State has successfully managed to bring federal, state, local, and tribal interests together to address some of the most widespread and difficult ground water quality issues. This Interagency

Ground Water Committee will continue to tackle important ground water issues in Washington State and will participate in the development of both the generic and pesticide-specific management plans.